

Burroughs
SERIES F25 - F500

SENSIMATIC ACCOUNTING MACHINE

(Includes F700 and F5000)

INSTRUCTION BOOK

Section I

●
APPLICATION AND OPERATION

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APPLICATION AND OPERATION

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Burroughs Sensimatic Accounting Machine



Fig. I-1

The Sensimatic Accounting Machine is very flexible and will handle most accounting or bookkeeping applications. Accounts Receivable, Accounts Payable, Payroll, Public Utility Billing, Tax Billing, Cycle Billing, Bank Posting - these and many other accounting jobs may be posted on the Sensimatic. In fact, several applications may be performed on the same machine through use of one or more sensimatic control units, each capable of handling four machine applications.

Information regarding any particular accounting job or any particular application can be found

in the Branch "Advertising and Reference File". The material in the S 1000 Section of this file contains customer advertising folders describing various applications; and the S 2000 Section contains technical reference material, form layouts, and operation sheets for the applications.

Sample Accounts Receivable posting directives are contained within this section of the Instruction Book and a study of each demonstrates the controls of many mechanical functions and features contained in Series F machines.

SENSIMATIC LINE IS DIVIDED INTO "SERIES"

The Sensimatic Line of Accounting Machines is divided into Series - F25, F50, F100, F200, F300, F400, F500, F700 and F5000. Series F100 contains only the basic mechanisms and features. The other series of machines contain additional mechanisms and features, thereby providing the flexibility for handling the wide variety of accounting applications. Each series of machines is subsequently divided into Styles - such as F101, F102, F201, F202, etc. - to indicate that the machines are designed for specific types of applications and contain special features necessary for those applications.

Except for special features, which apply to only certain Styles or Series of machines, the number, arrangement, and control of the accumulators constitute the major difference between the Series of machines. The following arrangement covers the computing mechanisms of the different Series of machines.

ACCUMULATOR ARRANGEMENT

MACHINE SERIES	ACCUMULATION SECTIONS		
	A	B	C
F25	CF	1 REG	
F50	CF	CF	
F100	CF	CF	
F200	CF	4 REG	
F300	CF	CF	9 REG
F400	CF	4 REG	4 REG
F500	CF	9 REG	9 REG
F700	CF	9 REG	
F5000	CF	VARIOUS	

Fig. 1-2

SERIES F100

The computing mechanism of Series F100 machines consists of two crossfooters - one each in accumulator sections A and B. Totals from the two crossfooters and general flexibility of this machine are enough to meet most accounting requirements.

Amounts may be added, subtracted, or non-added in either section or simultaneously in both sections, controlled either automatically or from the keyboard. Each mathematical function is appropriately identified by two symbols (one for each crossfooter) printed to the right of the amount. Symbols may be prevented from printing if desired.

Plus or minus total and subtotals may be obtained from either section controlled from the carriage or keyboard. Carriage controlled totals and subtotals may be taken with amounts indexed on the keyboard. Totals and subtotals may be printed with or without spacing operations. Crossfooter A totals and subtotals may be transferred to crossfooter B automatically; (1) to add if plus and subtract if minus - providing a net proof; (2) to add if plus and non-add if minus providing a plus net proof; or, (3) to non-add if plus and subtract if minus - providing a minus net proof.

SERIES F200

The computing mechanism of Series F200 machines consists of one crossfooter in section A and four accumulating registers in section B, thereby providing five totals. Registers in section B are selected automatically from the Sensimatic Control Unit.

Amounts may be added, subtracted, or non-added in either one section or simultaneously in both sections, controlled either automatically or from the keyboard.

Plus or minus totals and subtotals may be obtained from crossfooter A, controlled either automatically or from the keyboard, with or without amount keys depressed. Plus or complementary totals and subtotals of registers B are obtained automatically, with or without amount keys depressed. Crossfooter A totals and subtotals may be transferred to registers B to provide either Net, Plus Net, or Minus Net Proof.

SERIES F300

The computing mechanism of Series F300 machines consists of two crossfooters - one each in sections A and B - and nine accumulating registers in section C. Selection of registers may be controlled either automatically from the Sensimatic Control Unit or manually from keyboard register selection keys. A register designation symbol may be printed to identify the active register.

Amounts may be added, subtracted, or non-added in any one, any two, or in all three sections simultaneously, controlled either automatically or from the keyboard.

Plus or minus totals and subtotals of crossfooters A and B and plus or complementary totals and subtotals of register C, controlled either automatically or from the keyboard, may be obtained with or without amount keys depressed. Crossfooter A totals and subtotals may be transferred to crossfooter B or to registers C to provide either Net, Plus Net, or Minus Net Proof.

SERIES F400

The computing mechanism of Series F400 machines consists of one crossfooter in section A, four registers in section B, and four registers in section C. Carriage control of register selection is accomplished in the same manner as in Series F200 machines, except the registers are made active in pairs, each pair consisting of the same numbered register in sections B and C - for example, B-1 and C-1. Registers cannot be selected from the keyboard.

Amounts may be added, subtracted, or non-added in any one, any two, or in all three sections simultaneously, controlled either automatically or from the keyboard.

Plus or minus totals and subtotals of crossfooter A may be obtained either automatically or from keyboard controls. Plus or complementary totals and subtotals of registers B and C are obtained automatically from carriage control only. Crossfooter A totals and subtotals may be transferred to either registers B or C to provide either Net, Plus Net, or Minus Net Proof.

SERIES F500

The computing mechanism of Series F500 machines consists of one crossfooter in section A, nine registers in section B, and nine registers in section C. Registers bearing the same number in each section are selected simultaneously, controlled either automatically from the Sensimatic Control Unit or manually from the keyboard register selection keys. Register designation symbols are provided to identify the active pair of registers.

Amounts may be added, subtracted, or non-added in any one, any two, or all three sections simultaneously, controlled either automatically or from keyboard controls.

Plus or minus totals and subtotals of crossfooter A and plus or complementary totals and subtotals of registers B and C, controlled either automatically or from the keyboard, may be obtained with or without amount keys depressed. Crossfooter A totals and subtotals may be transferred to registers C to provide either Net, Plus Net, or Minus Net Proof.

SERIES F50

In addition to the five Series of machines described above, the Sensimatic line of machines includes the Series F50. The Series F50 is designed to handle limited accounting applications for both large and small businesses. The computing mechanism and other features of the Series F50 are similar to those contained in Series F100 machines with the following exceptions: Series F50 machines contain only two schedules in the Sensimatic Control Unit, five-position printing control, carriage controlled totals and subtotals of crossfooter A only, a two-position date repeat lever, form spacing adjustment of 0", 1/6", and 1/3", and no options in specifications except substitution of one or two-letter characters in place of standard characters.

SERIES F25

A limited number of Series F25 machines were built which are similar to the Series F50 with the following exceptions. The F25 has a one register unit mounted in the B crossfooter position. Plus or complementary totals are available from register B by manual means only. One panel with one schedule only can be used in the F25. The only options available were one or two letter character substitutions in column 11.

SERIES F700

The identifying features of the Series F700 is a crossfooter in the A accumulating position and a nine register accumulator in the B position. There are no new features on the F700. That is to say, all features found on the F700 are found on some other Basic F series of machines.

SERIES F5000

The F5000 is a wide keyboard style construction with dual printing heads which are located 7 1/4" apart. Each head has an individually controlled printing camshaft which allows either or both heads to be used for printing as desired. This reduces carriage travel and posting time where original ledger and statements are to be made.

Two or more accumulating units are used and the arrangement is determined by the basic machine style used. For example, the F5212 has the same crossfooter and register arrangement as the F212, the F5501 has the same accumulating arrangements as the F501. In the same way, plus or minus totals and net accumulation is determined by the basic series.

For a complete list and description of the features of the various Styles and Series of machines, refer to the "Styles of Machines" and "Basic Features" sections of the "Price List of Machine Features".

ACCOUNTING APPLICATION

To understand the mechanical features and principles of a machine, the purposes of its various mechanisms and their corresponding adjustments, it is, of course, always necessary to study carefully the operation for which the machine is designed, that is, the work it is to do, or its application.

As already mentioned, the "Form Layouts" for a great many applications are illustrated in the Branch "Advertising and Reference File" and they cover most of the kinds of work that Series F machines do as far as standard applications are concerned. In cases of individualized applications, of which there are naturally a great many, it is necessary to have an analysis sheet of "Form Layout", prepared specially for the particular application concerned.

The "Form Layout" is a comprehensive analysis sheet, which, together with its accompanying "Operation Sheets", illustrates carriage stop positions, printing controls, machine controls, forms, sample posting results, sequence of operation, special machine features and other information necessary to an understanding of the construction and work performed by the machine for a specific accounting application.

One of the commonest accounting applications is on Accounts Receivable. Such an application is illustrated herein, but before studying the application itself it is necessary to become familiar with some of the characteristics and controls of the Sensimatic machine.

These controls are explained in the following paragraphs and lead up to the actual posting operation, which is also set forth in full detail.

SENSIMATIC CONTROL UNIT

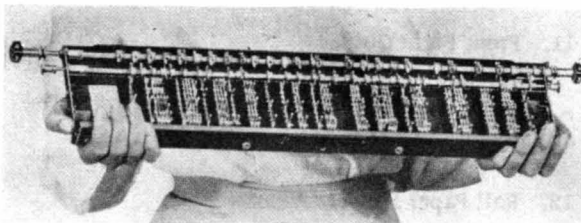


Fig. I-3

This is the Sensimatic Control Unit. It automatically controls carriage movements, carriage opening and closing, printing, form spacing and the mathematical functions of the machine. Control units may be set up to do any accounting operation. Control units are also interchangeable, thereby rendering the machine readily adaptable to almost unlimited accounting applications.

JOB SELECTOR KNOB

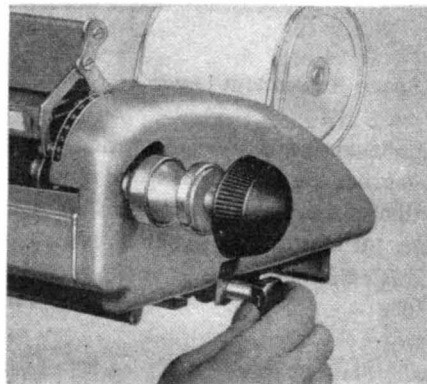


Fig. I-4

Each Sensimatic Control Unit is set to do four separate and complete accounting jobs. The controls for the different accounting applications are selected by moving the carriage to its extreme right or left limit and then turning the Job Selector Knob which moves a different set of controls into active position.

CARRIAGE FEATURES

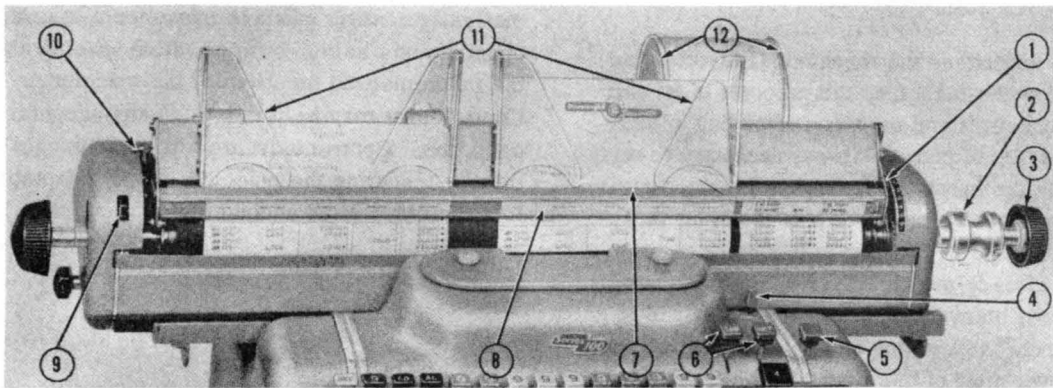


Fig. I-5

1. Form Space Adjustment Lever

The position of this lever determines the number of spaces the forms will space up when the operation of the machine actuates the spacing mechanism. It must be set when the carriage is closed and is adjustable from 0" to 1" in multiples of 1/6".

2. Variable Form Spacer

By pulling out the variable Form Spacer, the forms may be spaced a fraction of a regular space.

3. Platen Twirlers

Platen twirlers, one on each end of the platen, are used for spacing the forms manually.

4. Sensimatic Control Lever

Enables or disables the automatic controls in the Sensimatic Control Unit. See page 9 for description.

5. Carriage Opening and Closing Key

Depressing this key closes the carriage if it is open, or opens the carriage if it is closed. The carriage closes automatically when the machine is operated.

6. Column Selector Keys

These two keys are used to move the carriage to the right or left. See "Carriage Control Keys", page 9 for description.

7. Visible Line Finder

Is used for aligning front inserted forms to the writing line while the carriage is open.

8. Form Heading Holder (Removable)

Accommodates form heading inserts and provides a quick means of determining the carriage printing position. The right-hand side of the printing position is indicated by the red marker on the top of the ribbon cover.

9. Alignment Protector Button

With the carriage open, depressing this button closes the front pressure rolls, if desired, for holding front inserted forms in alignment against the platen. The front pressure rolls also close automatically with the closing of the carriage.

10. Pressure Roll Release Lever

With the carriage open, moving this lever rearward releases the rear pressure rolls so that the journal may be adjusted.

11. Front Form Guides

Front-feed form guides provide positive form alignment. See page 9 for description.

12. Roll Paper Holder

Accommodates the roll paper. See page 10 for description.

SENSIMATIC CONTROL LEVER

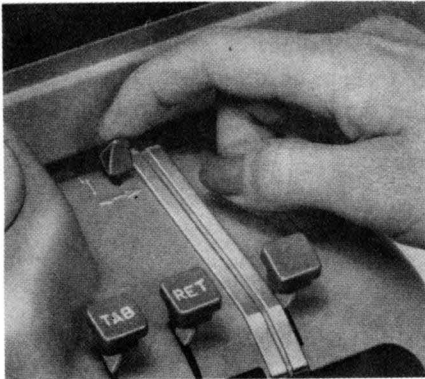


Fig. I-6

When this two-position lever is in its forward position, the machine is set for accounting work and will function according to the automatic controls in the Sensimatic Control Unit. When the lever is in its rearward position, the machine is set for listing work and functions as a two-total, adding-subtracting machine, the Sensimatic Control Unit having no effect upon its operation.

CARRIAGE CONTROL KEYS

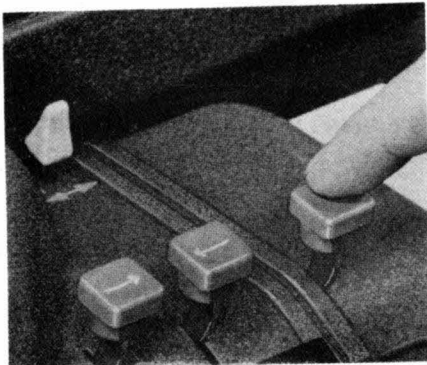


Fig. I-7

Carriage movement and carriage opening and closing is controlled automatically by the Sensimatic Control Unit. However, the automatic control provided by the Sensimatic Control Unit may be varied when necessary. Depressing the carriage opening and closing key closes the car-

riage if it is open, or opens the carriage if it is closed. The carriage closes automatically when the machine is operated. Depressing the column selector keys moves the carriage to the right (RET) or left (TAB). A touch of either key moves the carriage to the next adjacent position. When held down, either key causes continuous carriage travel and, unless the key is released to stop the carriage at another active position, the carriage will move to the right - or left - hand carriage limit, out of operating position.

FORM INSERTION

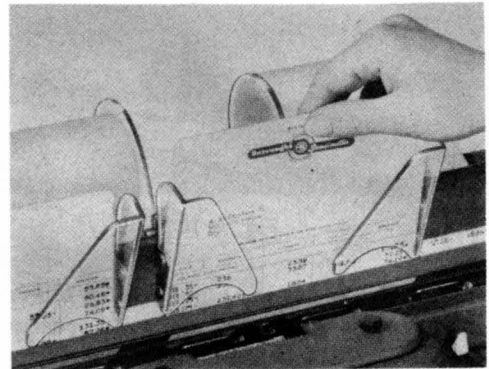


Fig. I-8

Front feed forms are guided in the front by transparent form guides and in the rear by a set of form chutes. Usually, forms are aligned to the last line of posting. In such cases, the visible line finder is used to provide quick easy alignment. When all accounts are posted on a common writing line, the adjustable limits on the Rear Form Guide Assembly are used to limit the distance each form may be inserted.

ADJUSTABLE FORM GUIDES

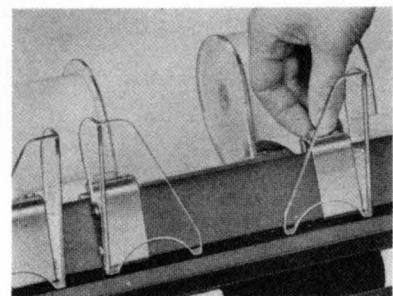


Fig. I-9

The transparent form guides are easily adjustable. They may be adjusted to accommodate almost any size form by simply loosening the thumbscrews. Tightening the thumbscrews automatically squares the guides. Two sets of guides may be used for posting to two forms - such as original ledger and statement - in one operation.

FULL POSTING VISIBILITY

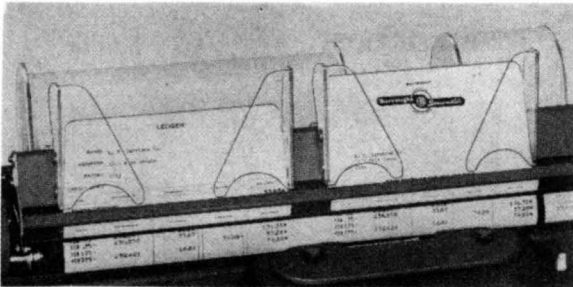


Fig. I-10

The Sensimatic Machine provides full Posting visibility. The operator sees the account name, reference number, current posting and the previous lines of posting at all times. The transparent guides hold the forms firmly without obstructing vision. A Form Heading Holder is provided to identify the posting column.

JOURNAL ROLL AND LISTING TAPE

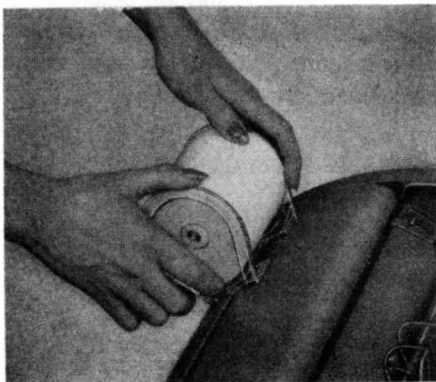


Fig. I-11

A continuous roll journal which records all posting transactions and a listing tape are mounted on the rear of the carriage. The holders for the paper rolls may be adjusted to accommodate various widths of roll paper. A tear-off blade, running the full width of the platen, is provided with each machine.

MOTOR BARS

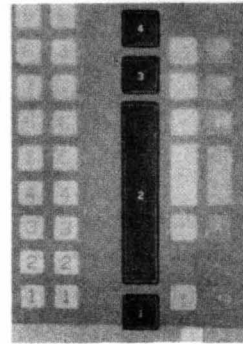


Fig. I-12

Simplified motor bars with specific functions make the Sensimatic Machine easy to operate. Bar 2 is used for the most common accounting operations. The other bars are used for the unusual or exceptional entry.

The basic function of each bar is as follows:

Bar 2 operates machine, permits carriage to tabulate to the next adjacent stop position.

Bar 1 operates machine, spaces the forms and returns the carriage to a predetermined position.

Bar 3 operates machine, spaces the forms and prevents movement of the carriage.

Bar 4 operates machine, causes the carriage to tabulate to a predetermined position, skipping intervening stop positions.

The basic functions of Bars 1, 2 and 4 may be altered by automatic controls in the Sensimatic Control Unit.

KEY DEPRESSION



Fig. I-13

Key depression on the Sensimatic is light and easy to provide maximum operator speed with minimum effort. The standard full keyboard aids in speed and positive indexing of amounts. Partially depressed keys halt the machine operation - preventing unintentional operation. Keys and motor bar may be depressed simultaneously.

ERROR CORRECTION



Fig. I-14

The Sensimatic keyboard is designed for easy error correction. If a wrong key is depressed, correction is made simply by depressing the correct key in the same column. If the entire amount is wrong, correction is made simply by depressing the error key and indexing the correct amount.

DATE KEYS

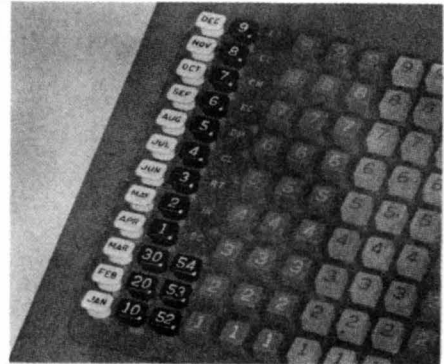


Fig. I-15

The date keys are indexed on the keyboard and either printed or non-printed - controlled by the Sensimatic Control Unit. The date keys may be locked down or restored after each machine operation. A three position date repeat lever is used to control the repeating of the date keys. With the lever in the first position, the date keys are restored after each machine operation. In the second position, the month and year date keys repeat and the day keys release. In the third position, the day, month and year keys remain indexed and are repeated automatically.

CHARACTER KEYS

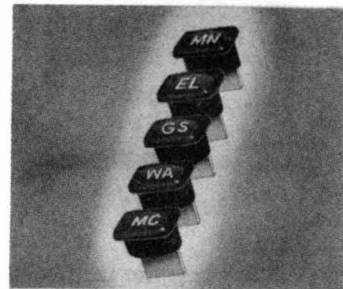


Fig. I-16

Character code keys are provided for describing the kind of service, charge, or credit on the statement and ledger. These keys may be repeated with the date keys or with the amount keys. Keystems for the character keys may be notched so that they may be latched down and printed on every account posted.

ACCUMULATOR CONTROL KEYS

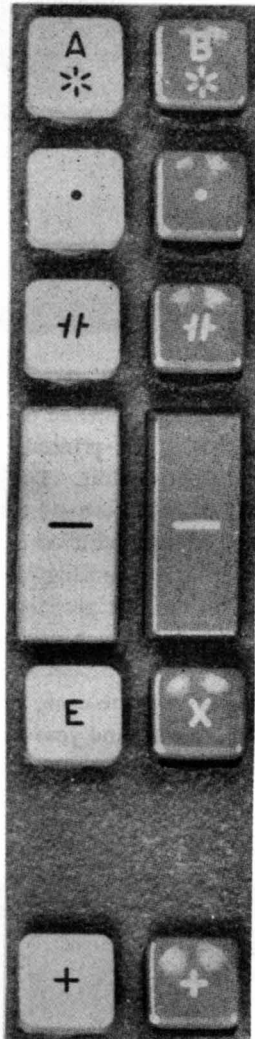


Fig. I-17

Separate control keys are included for each of the two accumulators, A and B. These keys provide flexibility both in the listing and in the accounting operations. With the machine set for listing, the operator may select the control keys to perform the required mathematical functions. The add, subtract, and non-add keys may also be used to handle unusual entries, or to reverse an entry.

Total Keys

Operate machine, total the amount accumulated in accumulator A or B. If total is plus, prints in black; if minus, prints in red.

Subtotal Keys

Operate machine, subtotal the amount accumulated in accumulators A or B. If subtotal is plus, prints in black; if minus, prints in red.

Non-Add Keys

Non-add keys prevent accumulation in accumulators A or B, prints in black when the machine is operated.

Subtract Bars

Operate machine, subtract amounts from accumulators A or B, prints in red.

Error Key

Releases all keys indexed on keyboard except date keys under control of date repeat lever.

Repeat Key (Marked "X")

Repeats amounts and characters indexed on the keyboard; may be latched down.

Add Keys

Add amounts in accumulators A or B, prints in black when the machine is operated.

SYMBOLS

The various mathematical functions of the machine are identified by appropriate symbols which are printed to the right of the amount. A separate set of symbols is provided for each accumulator. The standard symbols furnished on the basic machine are: + plus, - minus, * non-add, • subtotal, * total, CR or • minus subtotal, and CR or * minus total.

Special symbols are furnished as an optional feature when required.

THE POSTING OPERATION

POSTING ACCOUNTS RECEIVABLE - WITH ORIGINAL LEDGER AND STATEMENT										LISTING TAPE			
LEDGER					STATEMENT					(2nd OLD BAL.)	(PROOF)	(1st OLD BAL.)	
DATE	REFERENCE	CHARGES	CREDITS	BALANCE	DATE	REFERENCE	CHARGES	CREDITS	BALANCE	JUL 15	JUL 15	JUL 15	
BALANCE FORWARDED					BALANCE FORWARDED								
A. SINGLE CHARGE ITEM	JUL 15	1,2 34	10.00+	50.00•	JUL 15	1,2 34	10.00		60.00•	50.00-		50.00+	
	(1)	(2)	(3)			(4)	(5)	(6)		10.00•+			(9)
B. MULTIPLE CHARGES	JUL 25	1,2 35	10.00+		JUL 25	1,2 35	10.00						
	JUL 25	1,2 36	15.00+		JUL 25	1,2 36	15.00						
	JUL 25	1,2 37	10.00+	95.00•	JUL 25	1,2 37	10.00		95.00•	60.00-		35.00•+	
	(1)	(2)	(3)			(4)	(5)	(6)			(7)	(8)	(9)
C. SINGLE CREDIT ITEM	JUL 35	1,2 38		10.00-	JUL 35	1,2 38		10.00	85.00•	95.00-		10.00•-	95.00+
	(1)	(2)	(3)			(4)	(5)	(6)			(7)	(8)	(9)
D. MULTIPLE CREDITS	JUL 45	1,2 39		10.00-	JUL 45	1,2 39		10.00					
	JUL 45	1,2 40		15.00-	JUL 45	1,2 40		15.00					
	JUL 45	1,2 41		10.00-	JUL 45	1,2 41		10.00	50.00•	85.00-		35.00•-	85.00+
	(1)	(2)	(3)			(4)	(5)	(6)			(7)	(8)	(9)
ACCUMULATOR CONTROLS	CF A	NA	ADD	SUBT	SUBTOT	NA	NA	NA	SUBTOT	SUBT	TOT	ADD	NA
	CF B	NA	NA	NA	NA	NA	NA	NA	NA	NA	ADD	NA	

Fig. I-18

POSTING ACCOUNTS RECEIVABLE - WITH ORIGINAL LEDGER AND STATEMENT SERIES F100

This is a sample of one of the many accounting applications that may be posted on the Sensimatic. The purpose of showing this application is to explain the operation of the Sensimatic on an actual accounting application. For a more detailed description of Accounts Receivable or any other accounting application, refer to the Branch "Advertising and Reference File".

THE POSTING OPERATION

Before starting the posting operation, the machine is cleared by: (1) depressing the Directional Key - to move the carriage to position 9 on the listing tape; (2) moving the Sensimatic Control Lever to its rearward position - to disable the carriage controls; (3) depressing the B Non-add and A Total keys - to clear crossfooter A; and (4) depressing the A Non-add and B Total keys - to clear crossfooter B.

After the machine is cleared, the Sensimatic Control Lever is moved to its forward position to activate the carriage controls; the date is indexed on the keyboard and the date repeat lever is set in repeat position; the carriage is moved to its extreme right or left limit by depression of one of the directional keys; and the Job Selector Knob is set at Schedule 1 to post charges or Schedule 2 to post credits. The carriage is then moved to the starting position by depression of one of the directional keys.

A. POSTING A SINGLE CHARGE ITEM

1. Position 9 (1st Old Balance)

The last balance shown on the ledger is indexed on the keyboard and the statement and ledger are inserted into the machine and aligned to the last line of posting. Motor bar No. 2 is depressed and the machine operates - prints the amount on the listing tape, blocks the date from printing, adds the amount in crossfooter A, non-adds crossfooter B and automatically returns the carriage to the Date-Reference column on the statement.

Notes: (1) If the old balance is a credit, cross-footer A subtract bar is depressed instead of motor bar No. 2 and the amount is subtracted from crossfooter A.

(2) When forwarding balances on the statement, motor bar No. 1 is depressed. The machine operates - prints the amount and automatically returns the carriage to the Balance column on the statement.

The machine operates automatically in the Balance column - prints the amount and automatically returns the carriage to the Date-Reference column on the statement.

2. Position 4 (Date-Reference on Statement)

The reference number is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the date and reference number on the statement, non-adds both crossfooters A and B, retains the reference number indexed on the keyboard, and automatically returns the carriage to the Date-Reference column on the ledger.

Note: The two right-hand columns of the amount keys are not used for reference numbers, therefore, the reference number should be indexed so that the right-hand digit will be in the third column of keys from the right of the keyboard (the units of dollars column).

3. Position 1 (Date-Reference on Ledger)

The machine operates automatically - prints the date and reference number on the ledger, non-adds both crossfooters A and B, releases the keys indexed in the previous operation and automatically tabulates the carriage to the Charge column on the ledger.

4. Position 2 (Charges on Ledger)

The amount of the charge is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the ledger, blocks the date from printing, adds the amount in crossfooter A, non-adds crossfooter B, retains the amount indexed on the keyboard and automatically tabulates the carriage to the Balance column on the ledger.

5. Position 3 (Balance on Ledger)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing, non-adds crossfooter B, retains the amount of the charge indexed on the keyboard and automatically tabulates the carriage to the Charge column on the statement.

6. Position 5 (Charges on Statement)

The machine operates automatically - prints the amount of the charge on the statement, blocks the date from printing, non-adds both crossfooters A and B, releases the keys indexed in the previous charge column and automatically tabulates the carriage to the Balance column on the statement.

7. Position 6 (Balance on Statement)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing and non-adds crossfooter B. The carriage opens automatically and tabulates to the 2nd Old Balance position on the listing tape.

8. Position 7 (2nd Old Balance)

The ledger and statement are removed from the machine. The old balance is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the listing tape, subtracts the amount from crossfooter A, non-adds crossfooter B, blocks the date from printing and automatically tabulates the carriage to the Proof position.

Note: If the old balance is a credit, crossfooter A add key is depressed and then motor bar No. 2 is depressed.

9. Position 8 (Proof)

The machine operates automatically - prints a total of crossfooter A, blocks the date from printing, transfers the crossfooter A total to crossfooter B, spaces the platen, opens the carriage and tabulates the carriage to the 1st Old Balance position, which is the starting position for the next account.

Note: A direct proof is used to prove each posting at the time of posting. This is accomplished by picking up the old balance a second time and subtracting it from the new balance (reverse if credit balance), and printing the difference which should agree with the item posted. Where multiple items are posted, the proof will represent the net total of the posting. The totals of charges or credits posted are accumulated in crossfooter B. Charges and credits are usually posted at separate runs; however, they may be posted on the same run. Plus totals transfer to crossfooter B as add amounts and minus totals transfer as subtract amounts, thereby providing Net Accumulation of the Proof totals.

B. POSTING MULTIPLE CHARGES

1. Position 9 (1st Old Balance)

The last balance shown on the ledger is indexed on the keyboard and the statement and ledger are inserted into the machine and aligned to the last line of posting. Motor bar No. 2 is depressed and the machine operates - prints the amount on the listing tape, blocks the date from printing, adds the amount in crossfooter A, non-adds crossfooter B and automatically returns the carriage to the Date-Reference column on the statement.

Note: If the old balance is a credit, crossfooter A subtract bar is depressed instead of motor bar No. 2.

2. Position 4 (Date-Reference on Statement)

The reference number is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the date and reference number on the statement, non-adds both crossfooters A and B, retains the reference number indexed on the keyboard and automatically returns the carriage to the Date-Reference column on the ledger.

3. Position 1 (Date-Reference on Ledger)

The machine operates automatically - prints the date and reference number on the ledger, non-adds both crossfooters A and B, releases the keys indexed in the previous operation and automatically tabulates the carriage to the Charge column on the ledger.

4. Position 2 (Charges on Ledger)

The amount of the charge is indexed on the keyboard and motor bar No. 1 is depressed. The machine operates - prints the amount on the ledger, blocks the date from printing, adds the amount in crossfooter A, non-adds crossfooter B, retains the amount indexed on the keyboard and automatically tabulates the carriage to the Charge column on the statement.

5. Position 5 (Charges on Statement)

The machine operates automatically - prints the amount of the charge on the statement, blocks the date from printing, non-adds both crossfooters A and B, releases the keys indexed in the previous charge column and automatically returns the carriage to the Date-Reference column on the statement.

6. Position 4 (Date-Reference on Statement)

The reference number is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the date and reference number on the statement, non-adds both crossfooters A and B, retains the reference number indexed on the keyboard and automatically returns the carriage to the Date-Reference column on the ledger.

7. Position 1 (Date-Reference on Ledger)

The machine operates automatically - prints the date and reference number on the ledger, non-adds both crossfooters A and B, releases the keys indexed in the previous operation and automatically tabulates the carriage to the Charge column on the ledger.

8. Position 2 (Charges on Ledger)

If more charges are to be posted, the amount of the charge is indexed on the keyboard and motor bar No. 1 is depressed. The operation will be the same as in steps B-4, B-5, B-6 and B-7.

If this is the last charge item to be posted, the amount of the charge is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the ledger, blocks the date from printing, adds the amount in crossfooter A, non-adds crossfooter B, retains the amount indexed on the keyboard and automatically tabulates the carriage to the Balance column on the ledger.

9. Position 3 (Balance on Ledger)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing, non-adds crossfooter B, retains the amount of the charge indexed on the keyboard and automatically tabulates the carriage to the Charge column on the statement.

10. Position 5 (Charges on Statement)

The machine operates automatically - prints the amount of the charge on the statement, blocks the date from printing, non-adds both crossfooters A and B, releases the keys indexed in the previous charge column and automatically tabulates the carriage to the Balance column on the statement.

11. Position 6 (Balance on Statement)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing and non-adds crossfooter B. The carriage opens automatically and tabulates to the 2nd Old Balance position on the listing tape.

12. Position 7 (2nd Old Balance)

The ledger and statement are removed from the machine. The old balance is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the listing tape, subtracts the amount from crossfooter A, non-adds crossfooter B, blocks the date from printing and automatically tabulates the carriage to the Proof position.

Note: If the old balance is a credit, crossfooter A add key is depressed and then motor bar No. 2 is depressed.

13. Position 8 (Proof)

The machine operates automatically - prints a total of crossfooter A, blocks the date from printing, transfers the crossfooter A total to crossfooter B, spaces the platen, opens the carriage and tabulates the carriage to the 1st Old Balance position, which is the starting position for the next account.

C. POSTING A SINGLE CREDIT ITEM

1. Position 9 (1st Old Balance)

The last balance shown on the ledger is indexed on the keyboard and the statement and ledger are inserted into the machine and aligned to the last line of posting. Motor bar No. 2 is depressed and the machine operates - prints the amount on the listing tape, blocks the date from printing, adds the amount in crossfooter A, non-adds crossfooter B and automatically returns the carriage to the Date-Reference column on the statement.

Note: If the old balance is a credit, crossfooter A subtract bar is depressed instead of motor bar No. 2.

2. Position 4 (Date-Reference on Statement)

The reference number is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the date and reference number on the statements non adds both CF A and B, retains the reference number indexed on the keyboard and automatically returns the carriage to the Date-Reference column on the ledger.

3. Position 1 (Date-Reference on Ledger)

The machine operates automatically - prints the date and reference number on the ledger, non-adds both crossfooters A and B, releases the keys indexed in the previous operation and automatically tabulates the carriage to the Credit column on the ledger.

4. Position 2 (Credits on Ledger)

The amount of the credit is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the ledger, blocks the date from printing, subtracts the amount from crossfooter A, non-adds crossfooter B, retains the amount indexed on the keyboard and automatically tabulates the carriage to the Balance column on the ledger.

5. Position 3 (Balance on Ledger)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing, non-adds crossfooter B, retains the amount of the credit indexed on the keyboard and automatically tabulates the carriage to the Credit column on the statement.

6. Position 5 (Credits on Statement)

The machine operates automatically - prints the amount of the credit on the statement, blocks the date from printing, non-adds both crossfooters A and B, releases the keys indexed in the previous credit column and automatically tabulates the carriage to the Balance column on the statement.

7. Position 6 (Balance on Statement)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing and non-adds crossfooter B. The carriage opens automatically and tabulates to the 2nd Old Balance position on the listing tape.

8. Position 7 (2nd Old Balance)

The ledger and statement are removed from the machine. The old balance is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the listing tape, subtracts the amount from crossfooter A, non-adds crossfooter B, blocks the date from printing and automatically tabulates the carriage to the Proof position.

Note: If the old balance is a credit, crossfooter A add key is depressed and then motor bar No. 2 is depressed.

9. Position 8 (Proof)

The machine operates automatically - prints a total of crossfooter A, blocks the date from printing, transfers the crossfooter A total to crossfooter B, spaces the platen, opens the carriage and tabulates the carriage to the 1st Old Balance position, which is the starting position for the next account.

D. POSTING MULTIPLE CREDITS

1. Position 9 (1st Old Balance)

The last balance shown on the ledger is indexed on the keyboard and the statement and ledger are inserted into the machine and aligned to the last line of posting. Motor bar No. 2 is depressed and the machine operates - prints the amount on the listing tape, blocks the date from printing, adds the amount in crossfooter A, non-adds crossfooter B and automatically returns the carriage to the Date-Reference column on the statement.

Note: If the old balance is a credit, crossfooter A subtract bar is depressed instead of motor bar No. 2.

2. Position 4 (Date-Reference on Statement)

The reference number is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the date and reference number on the statement, non-adds both crossfooters A and B, retains the reference number indexed on the keyboard and automatically returns the carriage to the Date-Reference column on the ledger.

3. Position 1 (Date-Reference on Ledger)

The machine operates automatically - prints the date and reference number on the ledger, non-adds both crossfooters A and B, releases the keys indexed in the previous operation and automatically tabulates the carriage to the Credit column on the ledger.

4. Position 2 (Credits on Ledger)

The amount of the credit is indexed on the keyboard and motor bar No. 1 is depressed. The

machine operates - prints the amount on the ledger, blocks the date from printing, subtracts the amount from crossfooter A, non-adds crossfooter B, retains the amount indexed on the keyboard and automatically tabulates the carriage to the Credit column on the statement.

5. Position 5 (Credits on Statement)

The machine operates automatically - prints the amount of the credit on the statement, blocks the date from printing, non-adds both crossfooters A and B, releases the keys indexed in the previous credit column and automatically returns the carriage to the Date-Reference column on the statement.

6. Position 4 (Date-Reference on Statement)

The reference number is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the date and reference number on the statement, non-adds both crossfooters A and B, retains the reference number indexed on the keyboard and automatically returns the carriage to the Date-Reference column on the ledger.

7. Position 1 (Date-Reference on Ledger)

The machine operates automatically - prints the date and reference number on the ledger, non-adds both crossfooters A and B, releases the keys indexed in the previous operation and automatically tabulates the carriage to the Credit column on the ledger.

8. Position 2 (Credits on Ledger)

If more credit items are to be posted, the amount of the credit is indexed on the keyboard and motor bar No. 1 is depressed. The operation will be the same as in steps D-4, D-5, D-6 and D-7.

If this is the last credit item to be posted, the amount of the credit is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the ledger, blocks the date from printing, subtracts the amount from crossfooter A, non-adds crossfooter B, retains the amount indexed on the keyboard and automatically tabulates the carriage to the

Balance column on the ledger.

9. Position 3 (Balance on Ledger)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing, non-adds crossfooter B, retains the amount of the credit indexed on the keyboard and automatically tabulates the carriage to the Credit column on the statement.

10. Position 5 (Credits on Statement)

The machine operates automatically - prints the amount of the credit on the statement, blocks the date from printing, non-adds both crossfooters A and B, releases the keys indexed in the previous credit column and automatically tabulates the carriage to the Balance column on the statement.

11. Position 6 (Balance on Statement)

The machine operates automatically - prints a subtotal of crossfooter A, blocks the date from printing and non-adds crossfooter B. The carriage opens automatically and tabulates to the 2nd Old Balance position on the listing tape.

12. Position 7 (2nd Old Balance)

The ledger and statement are removed from the machine. The old balance is indexed on the keyboard and motor bar No. 2 is depressed. The machine operates - prints the amount on the listing tape, subtracts the amount from crossfooter A, non-adds crossfooter B, blocks the date from printing and automatically tabulates the carriage to the Proof position.

Note: If the old balance is a credit, crossfooter A add key is depressed and then motor bar No. 2 is depressed.

13. Position 8 (Proof)

The machine operates automatically - prints a total of crossfooter A, blocks the date from printing, transfers the crossfooter A total to crossfooter B, spaces the platen, opens the carriage and tabulates the carriage to the 1st Old Balance position, which is the starting position for the next account.

ADDITIONAL FEATURES ARE USED FOR SPECIFIC APPLICATIONS

In addition to the basic Sensimatic features, other features are used to provide greater flexibility of operation. These features are usually contained in specific styles of machines which are designed for specific types of applications. For a complete list and description of the various special and optional features, refer to the "Styles of Machines" and "Optional Features" sections of the "Price List of Machine Features".

WORD DESCRIPTION KEYS

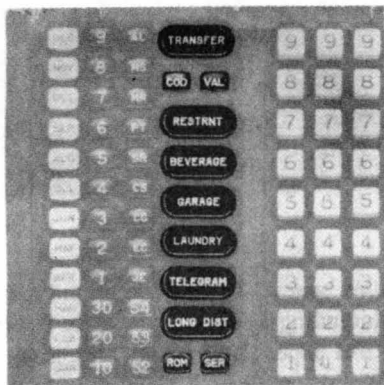


Fig. I-19

Word description keys (bridged keytops) are used for applications in hospitals, hotels, garages and specialty shops. Entire words up to 7 characters may be printed from a single key depression to identify various entries.

LOCKS

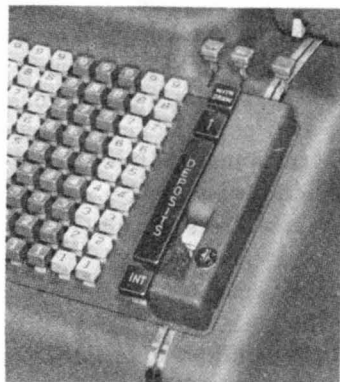


Fig. I-20

A locked cover over the result and control keys is used to prevent the alteration of entries by unauthorized persons. Through the use of this cover, totals may be locked in and then printed by only the person who has the key. The error key is left open to permit correcting amounts indexed on the keyboard.

Locks are also used to prevent operation of the machine or changing of the date keys or rotary dial indexed date by unauthorized persons.

ROTARY DIAL INDEXED CALENDAR FEATURE

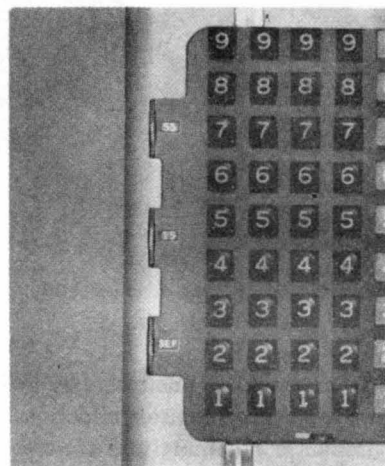


Fig. I-21

On certain styles of machines, the month, day and year are indexed from rotary dials located to the left of the keyboard. This provides increased keyboard capacity for indexing of amounts. A lever is included which locks the dials in their indexed position to prevent accidental changing of the date.

COUNTER DIALS

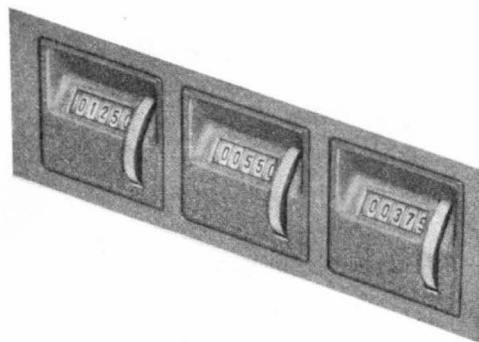


Fig. I-22

Counter dials are used to count certain items during a posting run or to count the total number of statements prepared by counting old or new balances, etc. These dial figures are useful for audit control purposes and in planning work schedules. The dials may be indexed to count from carriage controls and from selection of the proper register and depression of amount keys on the keyboard.

REGISTER SELECTION LEVER



Fig. I-23

This lever, which is controlled by locks and keys, is used to control register selection, thus providing separate accumulations of amounts, such as deposits and withdrawals, for each two operators. Characters are also indexed from the lever to identify the operator. In center position, the lever prevents machine operation; and when shifted to position A or B, selects the proper registers and permits machine operation.

MOTOR BAR MARKINGS

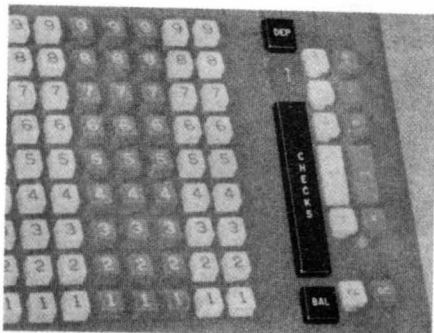


Fig. I-24

Motor bars, especially marked to indicate their basic functions, may be obtained. These markings make motor bar selection much simpler and eliminate errors in operation. The motor bars shown above are used for bank posting applications.

FORM GUIDES

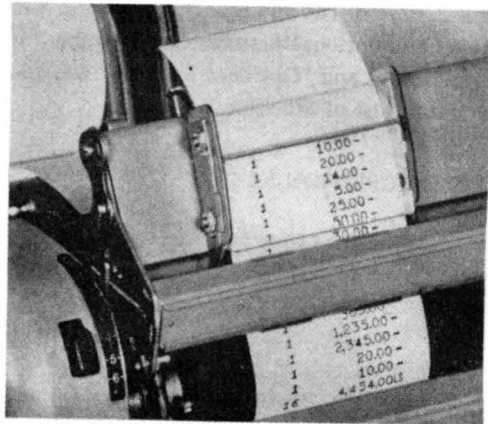


Fig. I-25

Various special styles of front and rear form guides, including a tear off blade for 2 1/4" or 3 7/16" roll paper (illustrated), are used to accommodate the variety of forms used in the many posting applications performed by the Sensimatic. In addition, various form supports, limits and aligning guides are used to make form handling easier and more positive.

AUTOMATIC COUNT

Automatic count mechanisms are used to count and print the number of certain items posted, such as checks, purchases, or payments; to advance and print a check number on payroll applications; and to count and accumulate the number of items posted during a posting run, such as checks, deposits, or old and new balances. The automatic count is indexed from carriage controls and from selection of the proper register and depression of keys on the keyboard.

SPLIT PLATEN

A split platen is used to permit independent vertical spacing of two forms. Either section of

the platen may be spaced or non-spaced - controlled automatically from the carriage.

CORRECTION KEYS

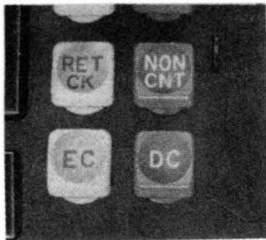


Fig. I-26

Special correction keys are used to facilitate reversing entries and making error corrections. The entry is identified and printed in red and the account balance and register accumulation are adjusted at the same time. The return check, error correction and deposit correction keys shown above are used for bank posting applications.

Burroughs
SERIES F25 - F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F700 and F5000)

INSTRUCTION BOOK

Section II



MECHANISMS AND ADJUSTMENTS
POWER

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POWER

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POWER MECHANISMS

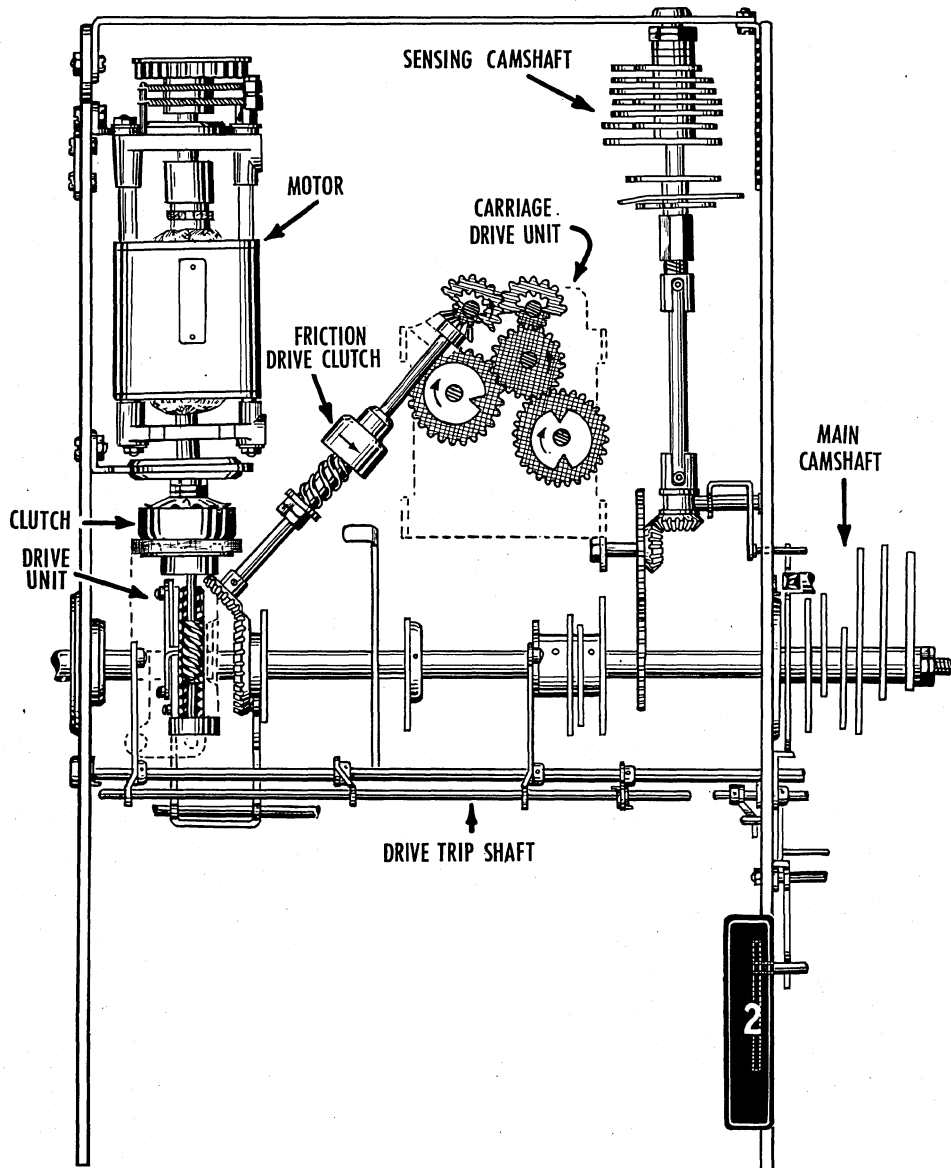


Fig. II-1

The power to actuate the various mechanisms and perform the many functions of the Sensimatic machine is provided by an electric motor which transmits power to a rotary driven main camshaft and a carriage drive unit.

When a motor bar or control key is depressed, the electrical circuit is closed through the drive

trip shaft which closes the switch points of the motor. Rotation of the armature shaft of the motor drives the worm gear of the drive unit through a friction clutch and a leather coupling. The friction clutch provides a flexible application of motor power to the main camshaft, thereby safeguarding the machine against possible damage in

the event the machining operation is obstructed. The leather coupling provides a quieter operation and a means of alignment between the friction clutch and the worm gear.

The worm gear drives a fibre worm wheel which revolves around the main camshaft and contains a toothed clutch member. The depression of a motor bar or control key, in addition to closing the motor switch points, releases the clutch release bail to permit the clutch dog, which is attached to the main camshaft, to engage with the toothed member of the worm wheel. Thus, rotation of the worm wheel rotates the main camshaft to permit the various cams that are pinned to the camshaft to actuate the various mechanisms and index the machine functions at their proper relative time during the machine cycle.

The drive trip shaft assembly is reset by cams on the main camshaft to permit the clutch release bail to locate in the path of the clutch dog and disengage it from the worm wheel near the end of the machine cycle. The main camshaft is held in normal position by a detent arm and roller which seats in a pocket of the full cycle cam.

The fibre worm wheel is also keyed to a bevel gear which drives the carriage drive clutch, thus transmitting motor power to the carriage drive unit. The carriage drive unit contains four gear driven clutch assemblies that control carriage tabulation, carriage return, form spacing and carriage opening and closing.

In addition to indexing and actuating the basic mechanisms of the machine, the main camshaft drives the sensing camshaft to provide a means of indexing the automatic (carriage controlled) functions of the machine. The sensing camshaft is coupled to a gear driven by the main camshaft through a bevel gear which is controlled by the Sensimatic Control Lever. This permits the machine to be used as a multi-total adding-subtracting machine for listing work or to function according to the automatic controls in the Sensimatic Control Unit for bookkeeping and accounting work.

TYPE 4 MOTOR

The Type 4 Motor used on Series F machines is of the AC-DC type. It operates, within a specified range, on different voltages of direct current

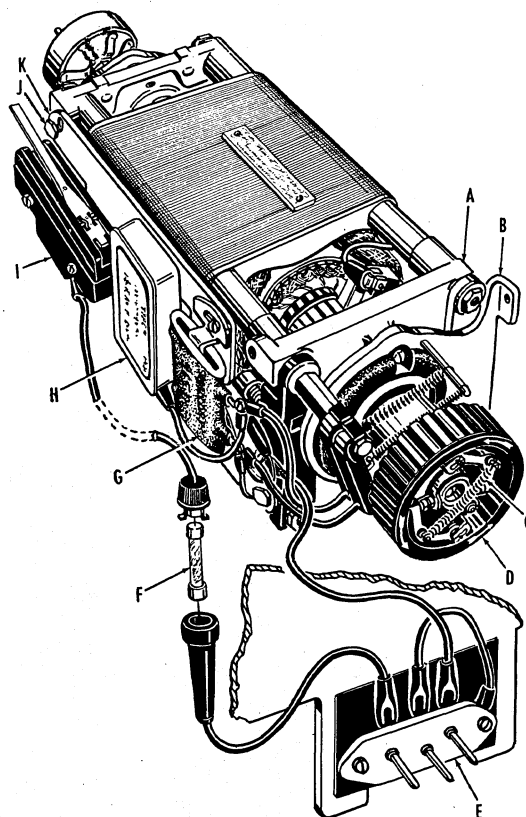


Fig. II-2

or different voltages and cycles of alternating current, and is mounted on the left sideframe of the machine by four screws.

Ball bearings located at each end of the armature shaft are of the double shielded type which require no lubrication. The bearings fit into castings A which are fastened to the mounting brackets. The rear casting also contains the commutator brush holders. The brush holders, which are held in contact with the commutator through spring tension, are of the pivotal arm type and are designed to insure uniform pressure and contact of the brushes on the commutator.

Three prong wall cord receptacle E provides a convenient means of attaching and detaching the wall cord to and from the machine when the electrical outlet is not easily accessible. A ground wire running from the center terminal of the receptacle to the machine backplate is used in conjunction with a three wire cord when grounding is necessary.

Speed of the motor is controlled by governor D which is fastened to the rear of the armature shaft. The governor is adjusted, through tension of spring C, to operate the machine between 108 and 110 cycles per minute when selecting register No. 1. The armature shaft rotates at a speed of 3180 R. P. M. on single printers and 5000 R. P. M. on dual printers. It can be seen from the above figures that the dual printers have a higher gear reduction ratio which enables the motor to drive the additional load. Centrifugal force overcomes the tension of spring C to separate the governor switch points and break the circuit when rotation of the governor exceeds the speed for which it has been adjusted.

Fusetron F, which is conveniently mounted in a holder attached to the sensing unit backplate, protects the motor by permitting only momentary overloading or stalling of the motor. Continued resistance against the motor operation causes the filament of the fusetron to melt, thus breaking the circuit.

Condenser H prolongs the life of the contact points by absorbing the spark or arcing when the points separate.

Resistance coil G is connected across the governor switch points to absorb the shock from the condenser discharge when the switch points close, thereby preventing the overheating of the governor switch points.

Microswitch I closes and opens the circuit between the wall cord and the motor to start and stop the motor. The microswitch is designed to operate with a light toggle action and minimum movement of the operating arm. The microswitch provides a positive opening and closing action of the switch points, thereby providing a constant transmission of motor power to the drive when the switch points are closed and less arcing and burning of switch points.

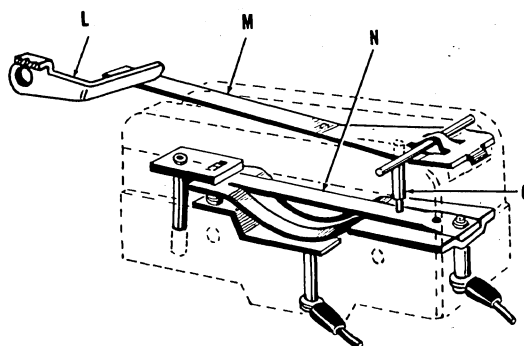
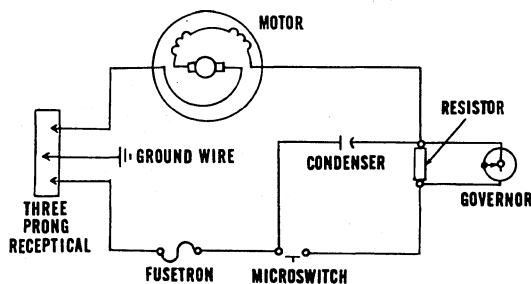


Fig. II-3

Movement of microswitch operating arm M from the drive trip mechanism or from depression of the tabulation, return, or carriage opening and closing key levers lowers plunger O to close the switch points and complete the circuit. The switch points restore to normal under tension of spring N when the operating arm is released.



WIRING DIAGRAM

Fig. II-4

The condenser, resistor and microswitch are mounted on plate K which is fastened to the front and rear motor castings by two screws J. The mounting plate contains an elongated slot which permits the assembly to be moved up or down to adjust the throw of the microswitch operating arm. The following diagram illustrates the wiring of the type 4 motor.

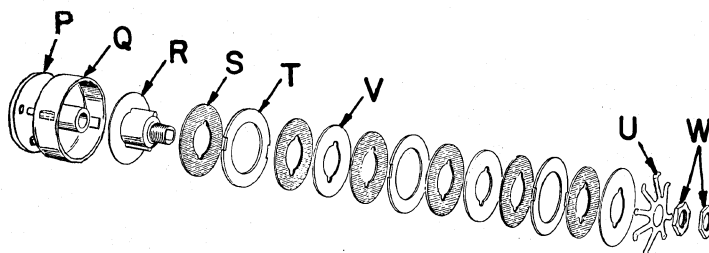


Fig. II-5

Motor power is transmitted to the worm gear of the drive unit through the friction drive clutch assembly. Rotation of the armature shaft turns spindle R, fiberglass disks S and steel disks V which are keyed to the spindle. Frictional contact of the fiberglass disks on steel disk T under tension of spring U turns the steel disks which are keyed to cylinder Q. Two studs on the forward portion of the clutch cylinder are meshed with leather coupling P which is meshed with two studs on the disk of worm gear, thus rotation of the clutch assembly turns the worm wheel to transmit power to the drive unit. In early machines disks S were made of carbon.

The friction clutch should slip. Reverse the motor about a half turn (approximately 10°). Connect power and the machine should complete the cycle.

TO ADJUST, turn nuts W to increase or decrease the pressure on spring U.

REASON: To safeguard the machine against possible damage in the event the operation is obstructed.

NOTE: On Series F5000 the motor must be removed in order to adjust clutch.

Test and Adjustments

P17-1 With the motor mounted to the machine, the leather coupling between the worm gear disk and the friction clutch cylinder should not bind.

TO ADJUST,

- A. Turn motor to align the two studs in the friction clutch cylinder horizontally to the machine.
- B. Loosen the motor mounting screws X and insert a .020" gauge between the leather coupling and the clutch cylinder.
- C. Move the motor forward until it contacts the gauge and retighten the motor mounting screws.

REASON: To establish the normal position for the motor.

P13-1 With the carriage controls disabled and no keys depressed, depress motor bar No. 2 and manually cycle machine to approximately 110° .

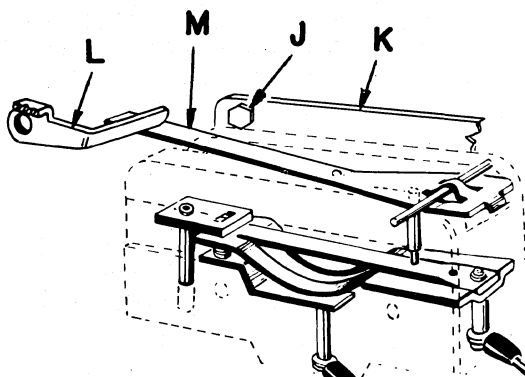


Fig. II-6

P14-1 With bellcrank L held in its normal position depress arm M to start the motor. Insert a .065" gauge between L and M, release arm M slowly, the motor should continue to run. With a .030" gauge inserted, the motor should not run.

TO ADJUST, loosen screw J and shift mounting plate K up or down as required.

NOTE: If additional adjustment is necessary, bend microswitch operating arm L.

REASON: To ensure that the motor will start before the drive clutch is tripped and that the motor will not be running after the machine cycle is completed.

DRIVE UNIT AND DRIVE TRIP MECHANISM

Tripping the Drive and Closing the Motor Switch Points

The drive is tripped to close the motor switch points and engage the drive clutch from depression of motor bars, subtract keys, subtotal keys and total keys.

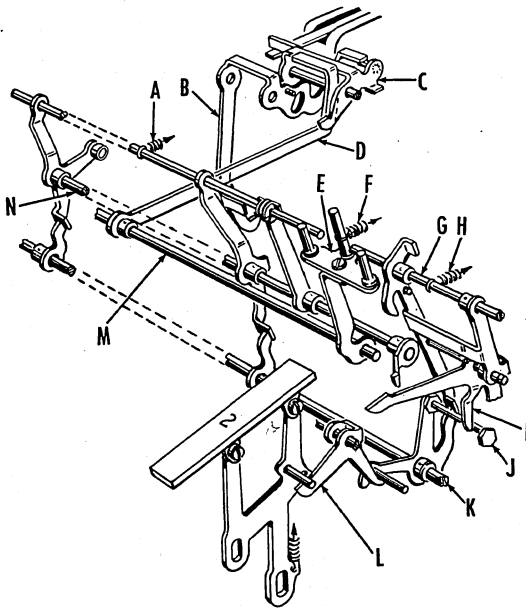


Fig. II-7

Depression of a motor bar or accumulator control key trips the drive when arms I or L rock shaft assembly K through the studs in the outer arm of the shaft assembly. The arms of shaft assembly K are lowered out of the path of the arms on shaft assemblies G and N to permit springs A and H to swing the shaft assemblies rearward. Rearward movement of the shaft assemblies permits spring F to move compensating lever E rearward rocking drive trip shaft assembly M to lower drive trip arm D. The drive trip arm rocks bail B to close the motor switch points through bail C.

Engaging the Drive Clutch

Rocking of bail B from the drive trip arm also releases bail O to permit spring P to engage clutch dog R with the toothed clutch member of worm wheel S. Thus, rotation of the worm gear and

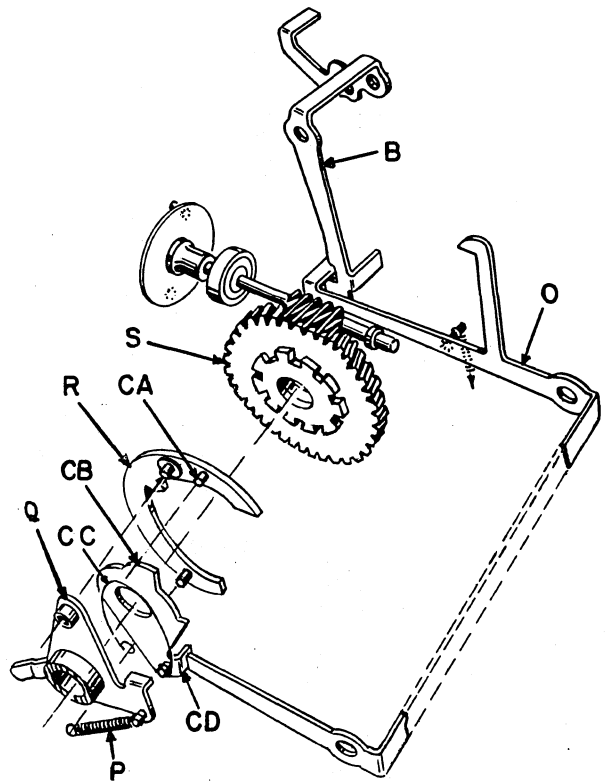


Fig. II-8

worm wheel rotates the main camshaft through the clutch dog and cam Q which is pinned to the main camshaft.

As clutch dog R engages the teeth of gear S, the tension of spring CC rotates cam CD on the main camshaft so that its cam portion CB is located under stud CA to prevent a disengagement of the clutch until the machine cycle is completed.

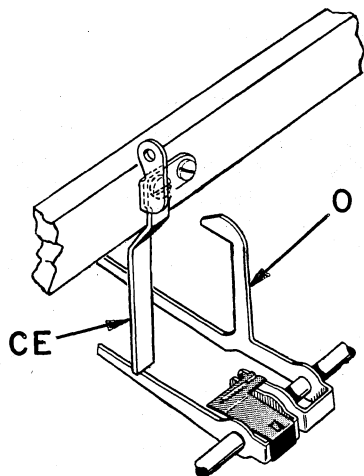


Fig. II-9

Bail O on F5000 machines is constructed with a broken joint. This allows clutch dog R to cam over the left end of arm O with a minimum downward movement of the right side. The right side of O in the F5000 must be held high enough to prevent interference with the adding rack. Brace CE prevents the left arm of O being raised into the tooth of gear R as O is reset on the F5000.

Rotation of the main camshaft provides the power to actuate the various mechanisms of the machine. The cams on the camshaft are designed and positioned to index the machine functions at their proper relative time during the machine cycle. The cams and the cam follower arms and levers provide positive indexing of the various mechanisms with a minimum of power. The timing disk on the left end of the camshaft facilitates making the tests and adjustments that are necessary to assure proper timing of the machine functions. Indexing of the machine functions from the cams on the camshaft is covered elsewhere under separate headings.

The worm gear assembly transmits motor power to the main camshaft at a gear ratio of 26.5 to 1 on the single printer machine and at a ratio of 42 to 1 on the dual printers. This would provide a camshaft speed of approximately 120 RPM, but under continuous operation, the clutch dog misses one tooth of the clutch member of the worm wheel between each machine operation thus providing a machine operating speed of 108-110 operations per minute on machines with crossfooter only on when selecting register No. 1 on register machines.

The worm gear is supported by bearings located at the front and rear of the bracket assembly. The bracket assembly on single printers also contains a thrust bushing which limits against the forward cross member of the machine frame to absorb the forward thrust of the worm gear bracket assembly.

Resetting the Drive Trip Mechanism

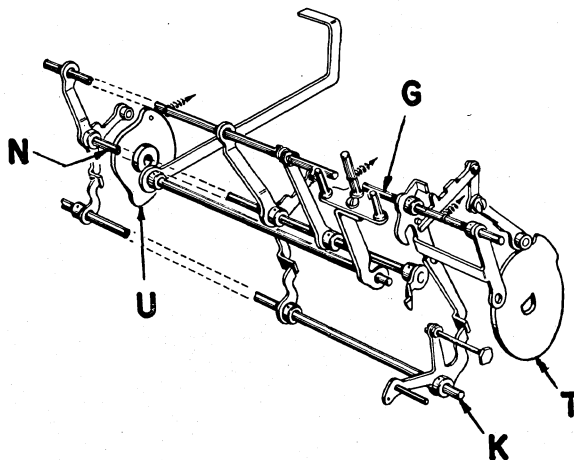


Fig. II-10

The drive trip mechanism is reset when cam T and cams U on the main camshaft rock shaft assemblies G and N forward, raising the drive trip arm and permitting the arms of shaft assembly K to locate in the paths of the arms on shaft assemblies G and N.

The motor switch points are held closed during the machine cycle by the formed ear of bail O holding bail B forward.

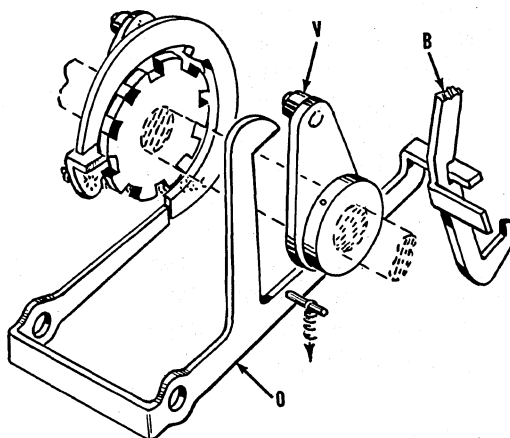


Fig. II-11

ENGAGING THE DRIVE CLUTCH IN MACHINES BEGINNING WITH # F144369P.

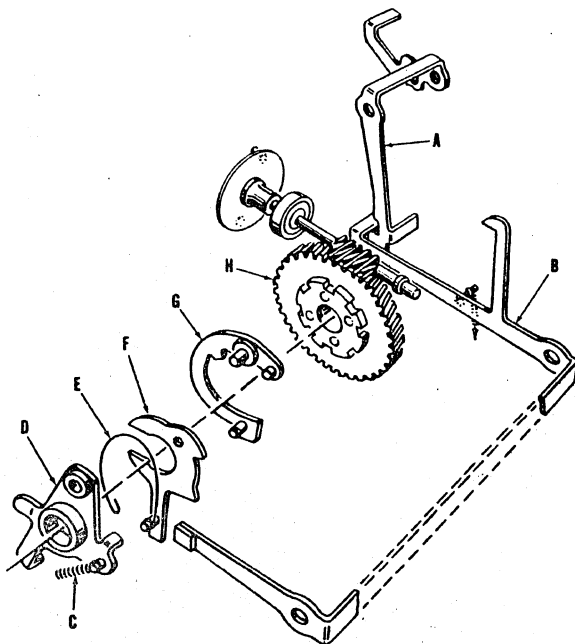


Fig. II-8A

Rocking of bail A from drive trip arm releases bail B. Block on left arm of bail B releases clutch dog G and locking cam F to permit spring C to engage clutch dog G with 8 tooth spline gear H. Thus, rotation of worn gear and spline gear rotates the main cam shaft through the clutch dog and part D which is pinned to the main cam shaft.

As clutch dog G engages the teeth of gear H, the tension of spring E rotates cam F on the shoulder of part D. This positions the cam surface of cam F under the upper stud of clutch dog G, thus prevents disengagement of the clutch until the machine cycle is completed.

Locking cam F has been slotted for field replacement. The lower projection of clutch dog G provides its normal disengaging limit when limiting against the lower formed ear of part D. Spring E is longer than the one used on prior lock in clutch mechanism.

Tests and Adjustments

P 1-4 With the machine at home position and clutch dog release bail B held to the right, clutch dog G should have a full hold on release bail B; and latch F when held to the left should have a full hold on release bail B. **TO ADJUST:** Loosen the set collars on the pivot shaft for bail B and position as required. Lateral play of bail B should not exceed .003" between set collars.

Reason: To ensure proper alignment of clutch dog release bail B with clutch dog G and latch F.

P 1-5 With the formed ear of clutch dog release bail limiting on the bottom step of drive trip latch; manually cycle the machine to approximately 180°. There should be .010" to .015" clearance between the clutch dog mounting cam and the clutch dog release bail.

TO ADJUST: Weave the clutch dog release bail as required.

Reason: To prevent an interference between the clutch dog release bail and the outline of the calender feature rack.

The clutch dog is disengaged from the clutch member near the end of the machine cycle when roll V raises bail O, positioning the left arm of the bail into the path of lip CD, Fig. II-8, rotating CB out from under stud CA. As the main camshaft rotates to normal clutch dog R is cammed out of engagement with the teeth of worm wheel S by the left arm of bail O. Clutch release bail O is latched on the step of bail B.

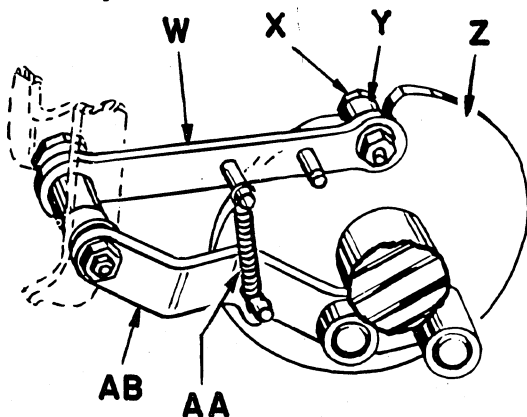


Fig. II-12

The main camshaft is held in normal position to permit free movement of the clutch dog release bail and to ensure proper engagement of the drive clutch by detent arms W and AB. The roller on detent arm W seats in a pocket of the full cycle cam under tension of spring AA. Lower arm AB prevents the spring tension from distorting the camshaft.

DRIVE UNIT TRANSMITS POWER TO CARRIAGE DRIVE UNIT

In addition to driving the main camshaft of the machine, the drive unit transmits motor power to the carriage, through a friction drive clutch and the carriage drive unit, thus furnishing the power to perform the various carriage functions. The carriage drive unit contains four clutch assemblies which open and close the carriage, space the forms and drive the carriage to the left or right during carriage tabulation or return.

Indexing of the carriage functions is accomplished through various sources which are covered elsewhere under separate headings.

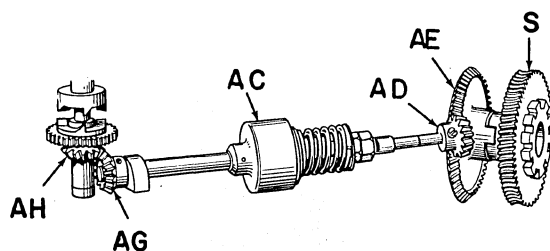


Fig. II-13

Bevel gear AE, which is keyed to worm wheel S, rotates carriage drive clutch assembly AC through gear AD, thus transmitting motor power to the carriage drive unit. The four clutch assemblies in the carriage drive unit are driven by bevel gears AG and AH and by the gears attached to the clutch assemblies.

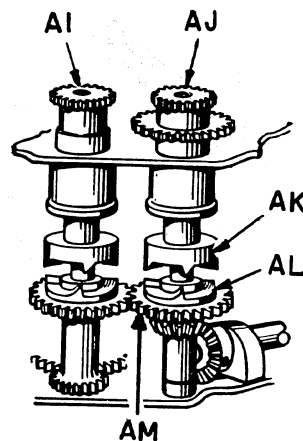


Fig. II-14

Return clutch member AL is rotated by the bevel gear on the rear of the carriage drive clutch assembly. When upper clutch member AK is lowered into engagement with the lower clutch member, the carriage is driven to the right through gear AJ which is meshed with a rack on the carriage.

The lower member of the tabulation clutch assembly is driven by gear AM, thus permitting the carriage to be moved to the left, through gear AI, when the upper clutch member is lowered into engagement with the lower clutch member.

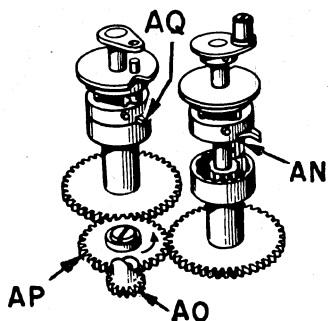


Fig. II-15

The lower members of the form spacing and carriage opening and closing clutch assemblies are driven from gear AO on the tabulation clutch member through intermediate gear AP. Form spacing or carriage opening and closing is accomplished when clutch dogs AN or AQ are released to engage one of the tooth spaces of the lower clutch members, thus permitting the lower clutch member to rotate the upper member to perform the indexed function.

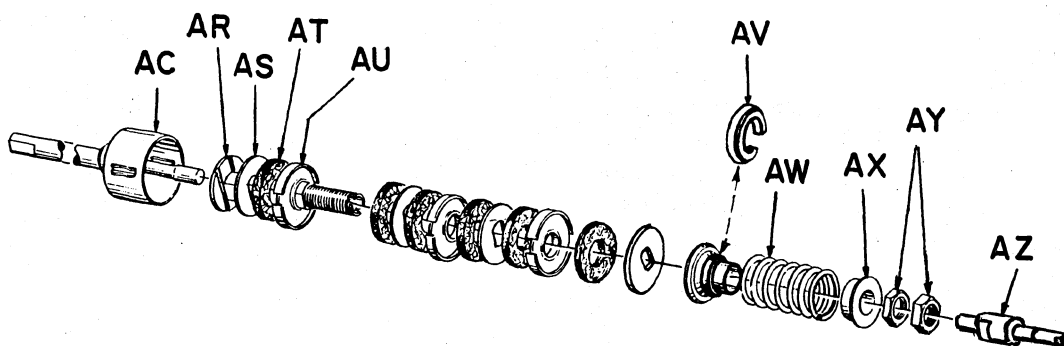


Fig. II-16

The carriage drive clutch assembly absorbs the inertia load of setting the carriage in motion and also safeguards the carriage against possible damage which might result from obstruction of the carriage's movement or function.

Shaft AZ is keyed to spindle AR, thus rotation of the shaft from the bevel gears rotates the spindle and steel disks AS which are keyed to the spindle. The frictional contact of steel disks AS against felt disks AT under pressure of spring AW turns steel disks AU which are keyed

to clutch drum AC, thus permitting rotation of the clutch drum and shaft to transmit power to the carriage drive unit.

The clutch is not adjustable and was designed to provide the necessary driving force for carriage operation when nut AY is tightened to cause the flanged collar AX to limit against the shoulder of spindle AR. A split collar, AV is used to provide more driving force for 18 and 22 inch carriages on F25 - F500 machines and on all F5000 machines.

Tests and Adjustments

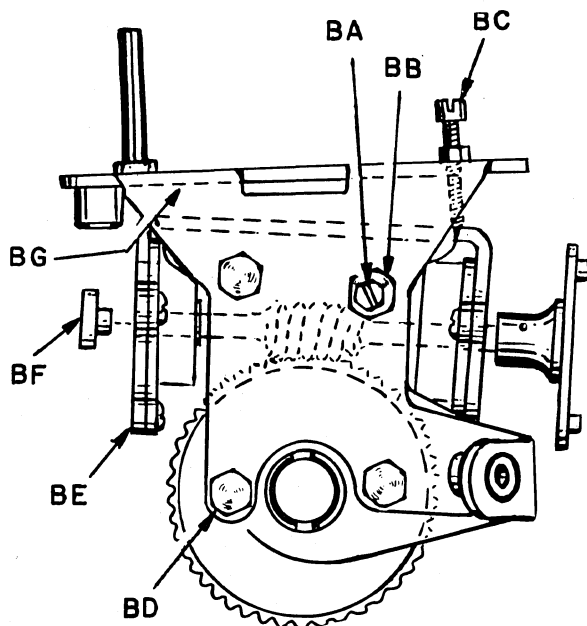


Fig. II-17

P12-1 With the machine normal, there should be .003" to .005" clearance between bushing BF and the cross bar.

NOTE: Bushing BF omitted on dual printers.
TO ADJUST,

- A. Loosen (3) screws BD and (1) screw BA.
- B. Position bracket assembly BE so that BF contacts cross member of machine.
- C. Tighten (3) screws BD.
- D. Turn eccentric BB rearward until it limits in the slot of bracket BG. Tighten screw BA.

For Dual Printers:

- A. Loosen screws BD and BA.
- B. Set BB with high side up.
- C. Tighten screws BD and BA and check for free rotation of the worm gear assembly. If the assembly is not free reposition BB until free rotation is obtained.

REASON: To prevent binding or cramping of the main camshaft and to permit free rotation of worm gear assembly.

P12-2 With the machine normal, there should be .003" to .005" clearance between limit screw BC and bracket assembly BE.

TO ADJUST, turn limit screw BC.

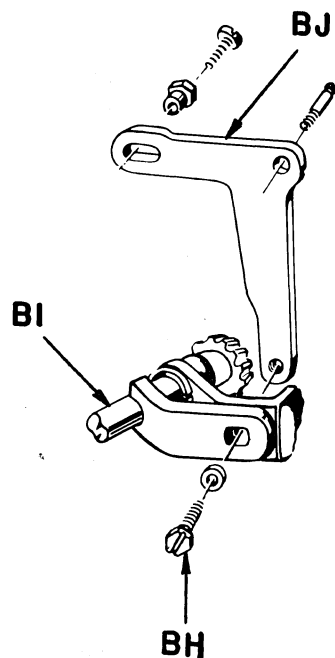


Fig. II-18

REASON: To prevent the upward thrust of the worm gear assembly.

P12-3 With screw BH tightened to secure the bottom of brace BJ, the top of brace BJ should have flush contact with the crossbar.

TO ADJUST, remove brace BJ and adjust as required.

REASON: To prevent distorting of the bearing hub for the angle clutch shaft BI.

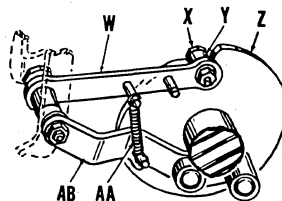


Fig. II-19

P1-1 With the machine in its normal position and the play of the main camshaft taken up in a rearward direction, there should be .005" to .010" clearance between the rear edge of cam detent Z and roller Y on full cycle arm W.

TO ADJUST, turn eccentric screw X.

REASON: To ensure tripping of the drive and free movement of the clutch dog release bail when the main camshaft is in the normal position.

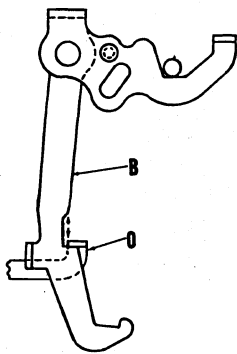


Fig. II-20

P11-2 With bail O lowered manually during the tripping of the drive bail O should permit the clutch dog R to engage. And, with the machine normal bail O should have no less than $\frac{2}{3}$ and no more than a flush hold on the contact surface of clutch dog R.

TO ADJUST, weave bail O as required.

REASON: To ensure engagement of the clutch dog.

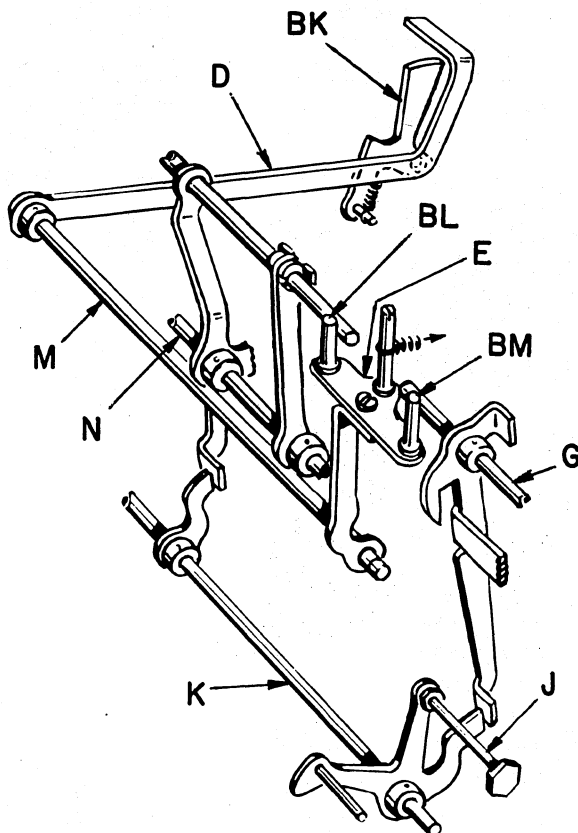


Fig. II-21

P11-1 Drive trip shaft M should have no more than .005" play between its end brackets.

TO ADJUST, position the bracket on the right end of shaft M as required and tighten screws.

REASON: To establish the normal position of the drive trip shaft, for correct alignment with component parts.

P11-2 With the machine normal and arms of shaft assemblies G and N limiting against arms of shaft K, there should be .050" to .060" clearance between the ear of arm D and drive trip interlocks BK. The formed ear of arm D must be parallel to shaft M.

TO ADJUST, weave compensating lever E to tilt studs BL and BM to the front or rear.

REASON: To ensure the correct amount of movement of latch bail B from drive trip arm D.

P11-3 With all keys in the top row indexed (except result keys) and clutch release arm O manually held upward, depress motor bar No. 2. There should be .015" to .020" clearance between the ear of clutch release arm O and latch bail B with O manually raised and lowered.

TO ADJUST, weave bail B.

REASON: To establish the correct relationship between the ear of clutch release arm O and the step on latch bail B.

P11-5 Partially depress one amount key, keeping its locking slide from moving rearward. With motor bar No. 2 depressed, the motor switch points should remain open.

TO ADJUST, recheck P11-1, P11-2 and P11-3.

REASON: To ensure correct movement of component parts.

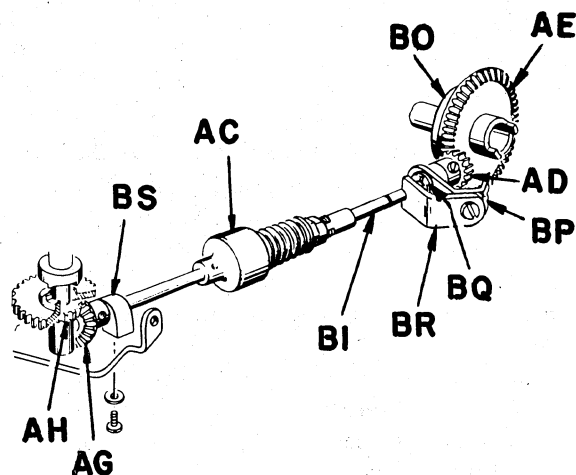


Fig. II-22

C15-1 Gear AG should have .003" to .005" play between gear AH and bearing BS.

TO ADJUST, position bearing BS toward or away from gear AG as required.

REASON: To ensure correct alignment of the gears and prevent excessive wear.

C15-2 There should be .005" to .025" overall end play between clutch assembly AC and shaft BI.

TO ADJUST, install washers BQ as required between the retainer clip on shaft BI and bracket BP.

REASON: To maintain a secure hold between clutch assembly AC and shaft BI.

C15-3 There should be .003" to .005" play between gear AD and bracket BP.

TO ADJUST, with shaft BI held forward, locate gear AD as required.

REASON: To provide a normal position for gear AD.

C15-4 Bracket BR should have a full hold on shaft BI without binding the shaft.

TO ADJUST, position bracket BR as required.

REASON: To stabilize shaft BI and prevent wear of the bearing in bracket BP.

C15-5 The rear edges of the teeth on gear AE should be flush with the rear edges of the teeth on gear AD.

TO ADJUST, move collar BO against AE and insert shims between collar BO and the cam on the right of the collar for free running gears and flush alignment.

REASON: To maintain alignment and prevent wear of the gears.

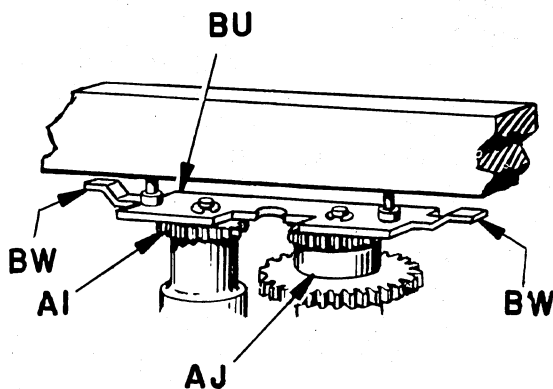


Fig. II-23

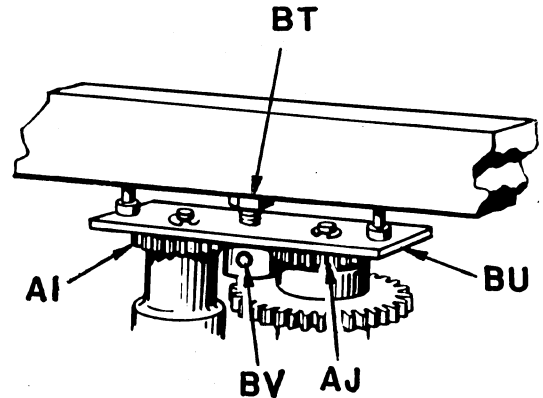


Fig. II-24

C12-29 There should be .002" to .005" clearance between limit plate BU and the top of carriage drive gears AI and AJ.

TO ADJUST, bend ears BW as required, in earlier machines turn adjusting screw BT as required and secure with Bristo screw BV.

REASON: To prevent wear of the carriage drive gears.

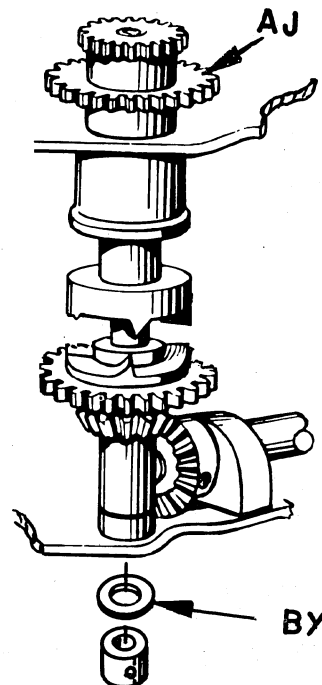


Fig. II-25

C13-1 There should be no more than .006" vertical end play of return spindle AJ.

TO ADJUST, insert washer BY.

between the bottom plate and the collar on the lower end of the return clutch shaft.

REASON: To ensure a free running shaft.

SENSING UNIT

Sensimatic control refers to the principle that permits mechanical indexing of automatic machine functions. Mechanical indexing is provided by two units; a carriage mechanism (Sensimatic Control Unit or panel which is covered in the carriage section) comprised of pins, stops, and discs located in several lanes of control, and a related mechanism, the carriage control sensing unit, which is activated during each machine operation to touch or "sense" pins corresponding to the required automatic functions. The blocking action of the touched or "sensed" pins, in the complete absence of load or friction with respect to carriage movements, results in selecting and indexing automatic functions with maximum simplicity, speed, and efficiency.

Automatic machine functions are indexed when rotation of the sensing camshaft, through its cams, raises the various sensing levers and tappets. When the tappets touch or "sense" the control pins in the Sensimatic control unit, their upward movement is limited. However, continued rotation of the sensing camshaft causes the opposite ends of the sensing levers to rise and impart movement of the various bellcranks that index the automatic machine functions through their respective linkages.

The cams on the sensing camshaft are designed and positioned to index the various carriage controlled functions at the proper relative time to ensure that the linkages are held indexed until the function has been completed.

MAIN CAMSHAFT TRANSMITS POWER TO CARRIAGE CONTROL SENSING UNIT

The carriage control sensing unit, which indexes the carriage controlled functions of the machine, receives its power from the main camshaft.

The sensing camshaft consists of individual cams and rollers which are designed and positioned to index the various carriage controlled functions at the proper relative time during the machine cycle.

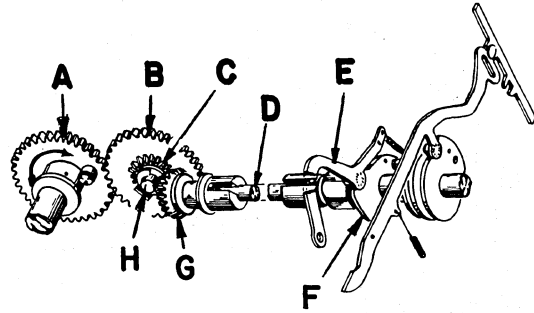


Fig. II-26

Rotation of the main camshaft rotates the sensing camshaft through gears A and B, bevel gears C and G, and coupler shaft D, thus furnishing the power to index the carriage controlled functions through the sensing cams, sensing levers, and tappets.

The roll on detent arm E seats in a pocket of cam F to hold the sensing camshaft in normal position and permit the sensing levers and tappets to limit on their guide plates. The detent arm also prevents excessive overthrow of the sensing camshaft at the completion of its cycle, thereby preventing interference between the sensing tappets and the control pins in the Sensimatic Control Unit during carriage tabulation or return.

Sensimatic Control Lever Disables Carriage Controls

The sensimatic control lever permits the carriage controls to be made active or to be disabled. With the lever in its forward position, the carriage controls are active and the machine will function according to the automatic carriage controls. With the lever in its rearward position, the carriage controls are disabled and the form spacing mechanism is made active, thus permitting the machine to be used as an adding machine for listing work.

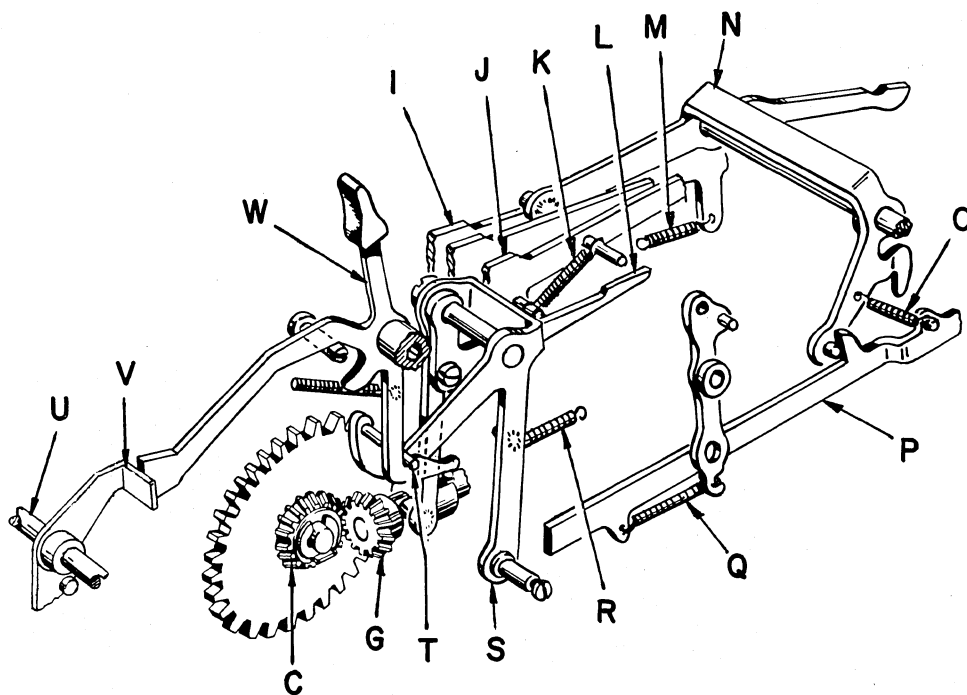


Fig. II-27

When moved to its forward position, sensimatic control lever W cams stud T upward to mesh bevel gears C and G through bail S. This permits the main camshaft to rotate the sensing camshaft and index the carriage controlled functions of the machine through the cams that are keyed to the shaft. Spring K lowers tabulation control slide J into active position, and form space control slide I is raised out of active position by springs M, O, and Q.

When the sensimatic control lever is moved to its rearward position, spring R swings bail S to disengage the bevel gears, and, through link P and bail N, lowers the form space control slide into active position. Arm L raises the tabulation control slide to inactive position.

To prevent the sensimatic control lever from being shifted during the machine cycle, the formed ear of arm X is positioned into the path of stud T, thus blocking movement of the lever.

Arm X is rocked early in the machine cycle by the roll on cam Y. This positions the formed ear under stud T when the sensimatic control lever is in its forward position and over the stud when the lever is in its rearward position. Arm

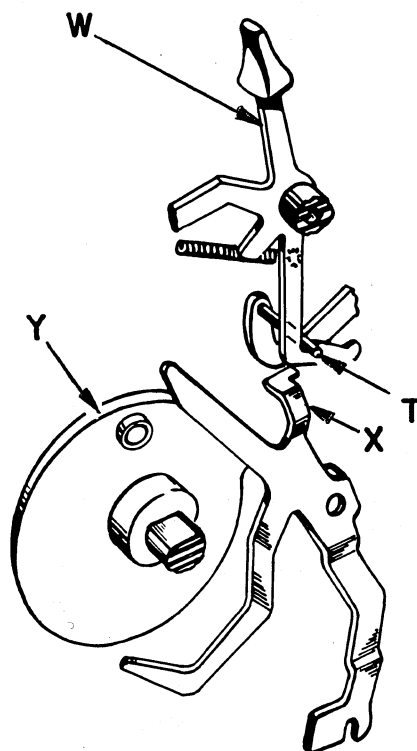


Fig. II-28

X is restored to normal at the approximate 340° point in the machine cycle by a roll on the cam adjacent to cam Y which rocks the lower arm of arm X.

The Carriage Control Sensing Unit

The Carriage Control Sensing Unit provides a means for the Series F machines to "read" the instructions built into the Sensimatic Control Unit and then automatically index the corresponding functions in the machine during the machine cycle.

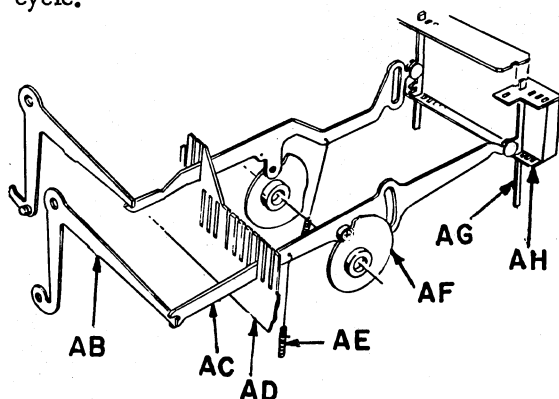


Fig. II-29

Rotation of the sensing camshaft as the machine cycles causes cams AF to raise sensing levers AC. Bellcranks AB cause the sensing levers to rock as they are raised until tappets AG on the ends of the sensing levers are limited by control pins in the Sensimatic Control Unit. Continued rotation of the sensing camshaft raises the opposite ends of the sensing levers, rocking bellcranks AB to index the machine functions. Springs AE restore the tappets to normal near the middle of the machine cycle as the high points of the sensing cams move away from the sensing levers. The sensing levers, with the exception of lane 25, should limit on the bottom of guide comb AD and tappet guide plate AH when the machine cycle is completed.

When there are no control pins in the path of the tappets, the tappet ends of the sensing levers are permitted to rise without imparting any motion to the bellcranks or their respective linkages.

Different length control pins impart different amounts of movement to bellcranks AB, permitting more than one function to be indexed by a lane of control.

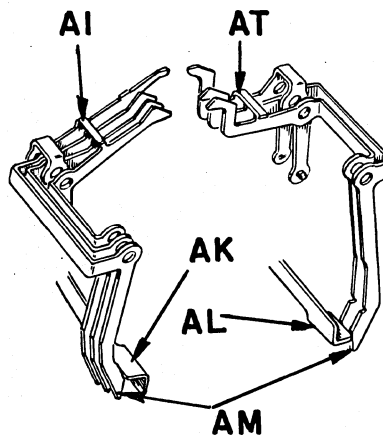


Fig. II-30

Selective carriage movement latches AM in lanes 1 through 5 hold paddle AK or AL on the Carriage Drive Unit raised to retain the tab or return clutch engaged until the selected carriage movement is completed. Arms AI and AJ ensure that the selective carriage movement latches are released when the carriage is moved to the extreme left or right end positions.

Latch Plates Retain Machine Functions Indexed

When machine functions indexed from carriage controls occur during carriage movement, latch plates retain the lanes of control indexed until the functions have been completed, thereby permitting the tappets to restore to normal before the carriage begins to move.

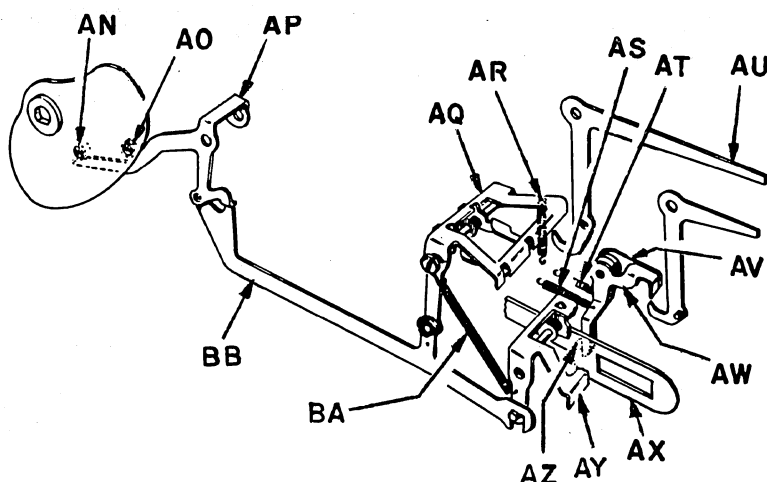


Fig. II-31

Early in the machine cycle, when minus balance control slide AX moves forward, springs AS and AT lower latch plates AW and AV. As the machine continues to cycle and rolls AN and AO move away from bail AP, springs AR and BA lower latch plates AQ and AY. When a lane of control is indexed and a latch plate is lowered, the formed edge of the latch plate is positioned in front of the hook of bellcrank AU to hold the lane of control indexed until the function is completed. If a lane of control is not indexed, the formed edge of the latch plate is lowered into the pocket in the bellcrank.

Late in the machine cycle, latch plates AQ and AY are raised to release the indexed lanes of control through roll AN, bail AP and link BB. Latch plates AV and AW are raised by stud AZ as the minus balance control slide restores to normal.

The lanes of control are indexed at various intervals during the machine cycle-even after the latch plates have been lowered. The yielding connection between latch plate AY and link BB permits latch plate AY to be raised during the indexing of a lane of control without releasing indexed lanes of control retained by latch plate AQ.

Latch plate AQ retains lanes 2 through 6, 8, 9 and 10 indexed; latch plate AV retains lane 12; latch plate AW retains lanes 13 and 14 and latch plate AY retains lanes 15, 18, 20 and 21.

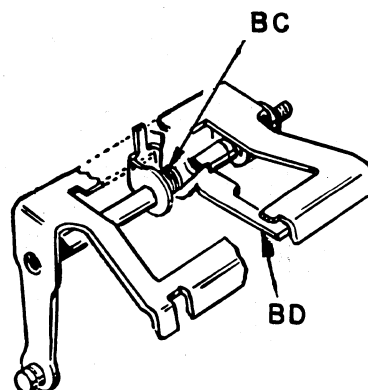


Fig. II-32

Lanes 7, 11 and 17 index subtract and non-add functions in accumulators "A", "B" and "C" respectively. Indexing the subtract functions requires more movement of the bellcranks in lanes 7, 11 and 17 than indexing non-add functions. Auxiliary latch plates BD are provided in lane 7, 11 and 17 to retain the subtract functions indexed; but when the non-add functions are indexed, the auxiliary latch plates are moved upward against the tension of torsion spring BC by the hook of the bellcrank to prevent the bellcrank from releasing other lanes of control.

Tests and Adjustments

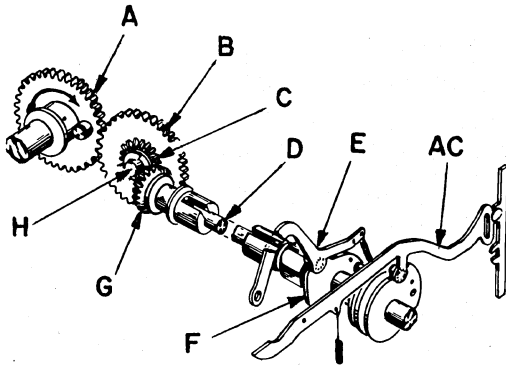


Fig. II-33

C6-1-2 The sensing levers must move freely in the slots of their guide comb.

TO ADJUST, weave the sensing levers as required.

REASON: To ensure correct indexing of the sensing levers.

C6-1-3 The cams of the sensing camshaft should be in alignment.

TO ADJUST, insert a shaft through the scoring holes in the cams, hold the hub of the cam assembly with a wrench, and tighten nuts on the rear of the sensing camshaft.

NOTE: Alignment of lane 22 thru 25 cams are to be determined visually.

REASON: To establish the normal position of the cams on the camshaft.

C6-1-4 With the sensing camshaft cycled one full turn, to seat the roller of detent arm E in the notch of cam F, the tappets should drop freely and limit against their bottom guide plate.

TO ADJUST, recheck test No. C6-1-2.

REASON: To ensure correct indexing of the sensing levers.

C6-1-5 NOTE: Facing the front of the assembly, rotate the camshaft in a counter-clockwise direction until the roller on detent E is on the incline of the pocket of cam F. When the camshaft is released, it should restore to home position.

REASON: To ensure free rotation and alignment of the camshaft.

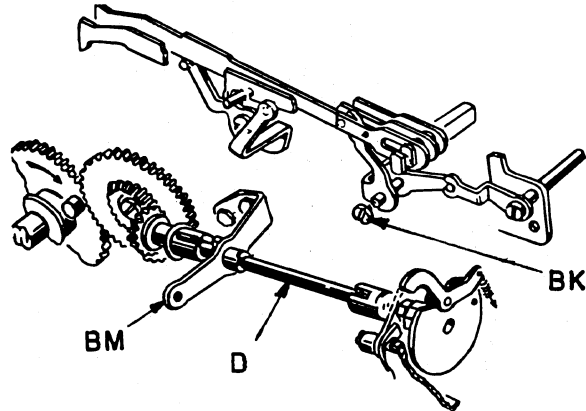


Fig. II-34

C13-5 Coupler shaft D should be free and centrally aligned with the head of screw BK.

TO ADJUST, loosen bracket BM and position as required.

REASON: To establish the normal position of the coupler shaft in relation to the coupling on the sensing camshaft.

C13-6 With the play of coupler shaft D held toward the head of screw BK, there should be .055" to .065" clearance between the coupler shaft and the head of screw BK.

TO ADJUST, weave bracket BM.

REASON: To establish the normal position of the coupler shaft in relation to the sensing camshaft.

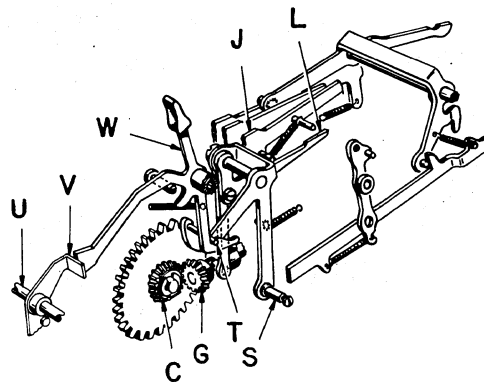


Fig. II-35

C11-4 Gears A and B should mesh fully without a bind during a complete machine cycle.

TO ADJUST, relocate post H.

REASON: To provide maximum depth mesh consistent with free running gears.

C11-5 With the carriage control normalizing lever forward, bevel gears C and G should be meshed fully without a bind.

TO ADJUST, weave bail S as required.

REASON: To provide maximum depth mesh consistent with free running gears.

C11-1 With the machine normal and carriage control normalizing lever W partially indexed, there should be .003" to .015" clearance between formed ear V on shaft assembly U and the forward projection of normalizing lever W.

TO ADJUST, bend formed ear V.

REASON: To prevent a drive trip when normalizing lever W is partially indexed.

C11-2 With carriage control normalizing lever W rearward and drive tripped, there should be no less than .003" clearance between formed ear V and normalizing lever W.

TO ADJUST, bend formed ear V.

REASON: To ensure tripping the drive when normalizing lever W is rearward.

C11-3 With carriage control normalizing lever W forward and the drive tripped, there should be no more than .030" clearance between formed ear V and normalizing lever W.

TO ADJUST, recheck C11-2.

REASON: To prevent shifting the normalizing lever rearward when the drive is tripped.

C11-6 With the carriage control normalizing lever rearward, tab key normal, tab slide J should be raised to the top of the slot in its guide comb without binding. Check for free movement of the tab slide by slowly depressing and releasing the tab key.

TO ADJUST, bend arm L as required.

REASON: To ensure disabling and free movement of tab slide J

C11-7A The left stud in bail S should be free and have a full hold in the groove of gear G and the sensing unit should restore to normal when the roller on the detent E is manually placed on the incline of cam F of the sensing unit and the sensing camshaft is released.

TO ADJUST, bend left arm of bail S as required.
REASON: To ensure free rotation and detenting the camshaft in its home position.

C11-8 With the machine normal, the play of the main camshaft held rearward, and bevel gears C and G meshed, the sensing camshaft should

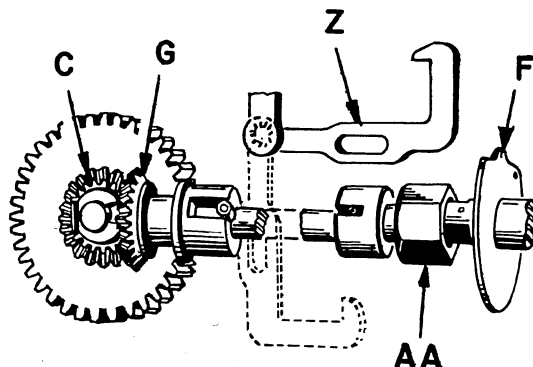


Fig. II-36

not move when an attempt is made to turn it clockwise (facing the rear of the machine) with a screw driver.

TO ADJUST,

A. Disengage gears C and G.

B. Loosen lock nut AA. To facilitate loosening the lock nut, remove the rear clip from slide Z and let the slide hang downward in the machine.

C. Mesh gears C and G.

D. Rotate the sensing camshaft counter-clockwise (facing the rear of the machine) until the tappets in lanes 3, 4 and 5 start to rise.

E. Tighten lock nut AA snugly.

F. While holding lock nut AA slowly rotate the sensing camshaft clockwise (facing the rear of the machine) to its normal position.

G. Securely tighten lock nut AA.

REASON: To provide immediate rotation of the sensing camshaft.

C11-9 With the play of the main camshaft held rearward, gears C and G should mesh and unmesh with no movement of the sensing camshaft.

TO ADJUST, recheck test C11-8, adjustments "A" thru "G".

REASON: To ensure against over-adjustment of the driving gears and coupler shaft.

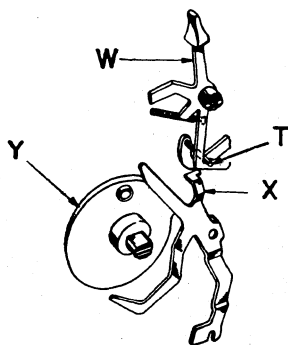


Fig. II-37

C11-7 NOTE: The formed ear of lever X should clear over stud T, during a machine cycle, when the carriage control normalizing lever is in its rearward position and should clear under stud T, during a machine cycle, when the normalizing lever is in its forward position.

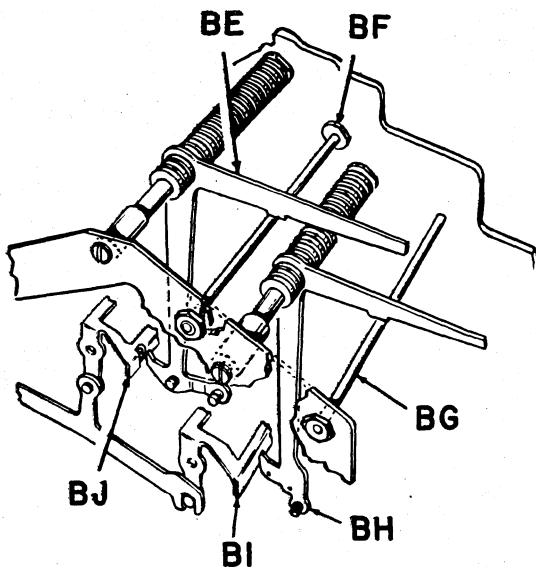


Fig. II-38

C1-1 With a No. 5 control pin active in lane 11, manually cycle the machine to 200° to latch bellcrank BE on latch plate BJ. There should be .055" to .059" clearance between bellcrank BE and limit post BF.

TO ADJUST, raise or lower limit post BF as required.

REASON: To establish the normal position for the sensing bellcranks in lanes No. 1 thru 11.

C1-2 With a No. 5 control pin active in lane 21, manually cycle the machine to 200° to latch bellcrank BH on latch plate BI. There should be .091" to .095" clearance between bellcrank BH and limit post BG.

TO ADJUST, raise or lower limit post BG as required.

REASON: To establish the normal position for the sensing bellcranks in lanes 12 thru 23.

C1-3 The sensing lever bellcranks should have at least .003" clearance over their respective sensing levers.

TO ADJUST, bend the sensing lever bellcranks.

REASON: To obtain sufficient clearance of the bellcranks over the sensing levers, to prevent bouncing of the tappets and the sensing levers return to normal.

NOTE: An exception to the above adjustment occurs in lane 20. Bend the end of the sensing lever for the required clearance.

C1-4 With any carriage controlled lane indexed and the machine cycled manually, the sensing levers should raise the indexed bellcranks BH and BE sufficiently to obtain at least .005" latching lead behind latch plates BJ and BI.

NOTE: This clearance is to be checked visually when the carriage is positioned at each end and in the center.

TO ADJUST, check panel height adjustments and recheck C1-3.

REASON: To ensure resetting of the indexed lanes of control.

Burroughs
SERIES F25 - F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F 700 and F 5000)

INSTRUCTION BOOK

Section III



MECHANISMS AND ADJUSTMENTS
KEYBOARD

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KEYBOARD AND INDEXING MECHANISMS

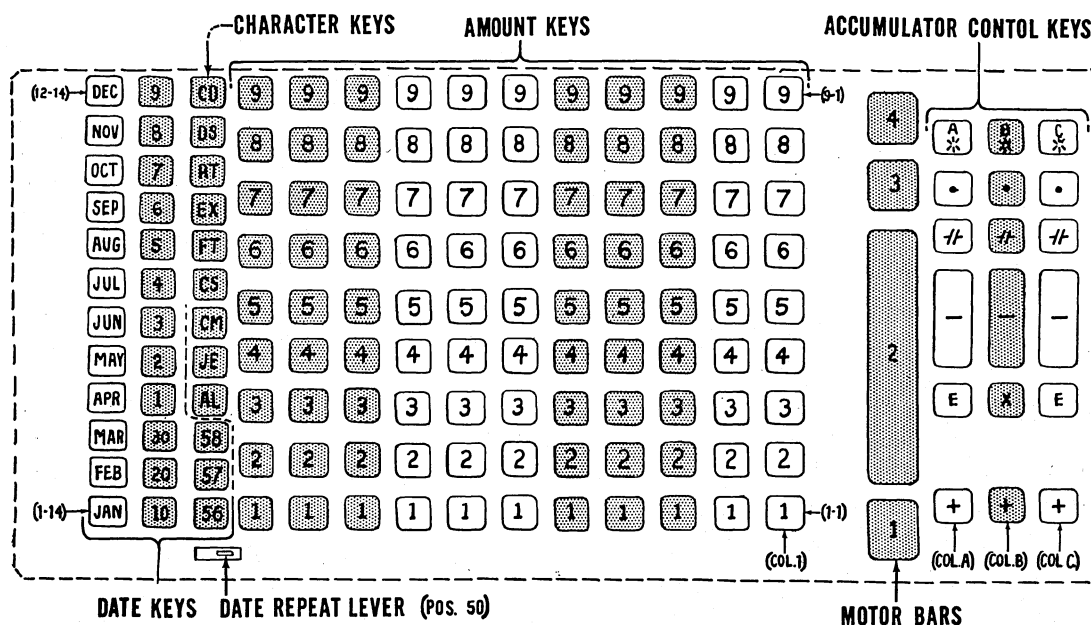


Fig. III-1

Amounts are introduced into the machine to be printed and/or accumulated through the keyboard and the keyboard indexing mechanism.

The keyboard used on Series F machines is of the full keyboard type - with amount keys, character keys, date keys, accumulator control keys and motor bars conveniently arranged for ease and speed of posting.

For uniform reference, the various keys, levers and motor bars are referred to by numerical designations. All keys except motor bars are designated first by key position and then by column position; i.e., 1-1 (position 1, column 1) through 9-1 (position 9, column 1). Motor bars

are numbered from 1 through 4, beginning with the lower bar.

The keyboard columns for the amount, date and character keys are numbered consecutively from right to left, beginning with column 1 for the units of cents column through column 14 for the leftmost column. Accumulator control key columns are designated as columns A, B and C starting with the first column to the right of the motor bars.

The various control levers are designated by a 50 series of numbers, the date repeat lever being designated as position 50.

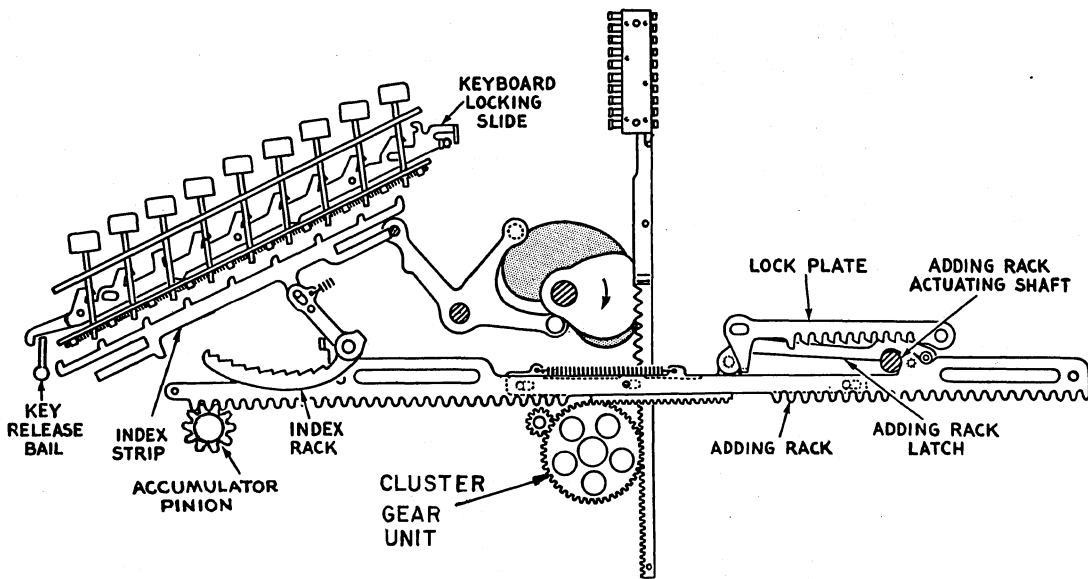


Fig. III-2

When an amount key is depressed and a motor bar is depressed to close the motor switch points and trip the drive, the keyboard locking slides are moved rearward to lock the keyboard against further manipulation of keys.

Rotation of the main camshaft permits the springs on the index racks to move the index strips rearward to limit on the depressed keystems and position the corresponding steps of the index racks into the paths of the adding racks.

The main camshaft also moves the adding rack actuating shaft forward, permitting the adding racks to move forward to limit on the steps of the index racks. As the adding racks move forward, the type bars are raised into printing position through the Cluster Gear Unit. The accumulator pinions are meshed with the toothed portion of the adding racks as they move forward on subtract operations and as they move rearward on add operations to turn the pinions and enter the indexed amounts in the accumulators.

When the formed ear of the adding rack limits on the step of the index rack, the actuating shaft cams the adding rack latch upward to locate its stud into a tooth space of the lock plate. This locks the adding racks in their indexed positions to permit restoring the depressed keys, index strips and index racks early in the machine cycle.

When the machine is operated with no keys depressed, the cipher steps of the index racks are positioned in the paths of the formed ears of the adding racks to prevent forward movement of the racks.

KEYBOARD CONSTRUCTION AND OPERATION

Double Slide Construction

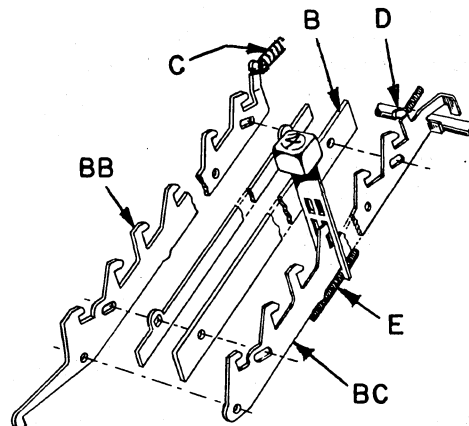


Fig. III-3

Depression of a keystem cams slide BB (the latching slide) forward until the key is fully depressed. Slide BB moves rearward by spring C to retain the keystem in the depressed position. If an incorrect key is depressed a correction may be made, prior to tripping the drive, by depressing the correct key in that column. The latching slide is cammed forward by the correct key depression allowing the incorrect key to be restored by spring E. If an entire amount is incorrect all keys may be restored simultaneously by depression of the error key. Slide BC (the locking slide) is allowed to move rearward as the drive is tripped. Slide BC presents a flat surface to the camming surface of the keystem, preventing manipulation of the keyboard after the drive trip. Slide BC is restored by shaft D just prior to the forward movement of BB by restoring bail I.

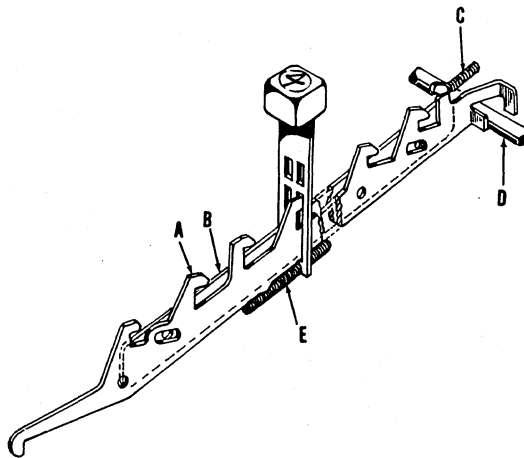


Fig. III-4

In earlier machines and in some columns of current machines, one slide A performs the same function as the slides BB and BC.

Strips B provide a downward limit for the keystems, thus permitting free movement of locking slides when keys are depressed.

Releasing the Depressed Keys

Amount, date and character keys are released at the approximate 190 degree point in the machine cycle, when rotation of the main cam-

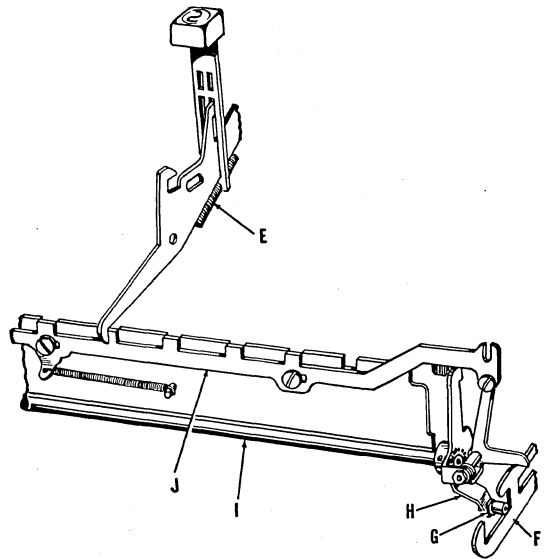


Fig. III-5

shaft moves add control slide F rearward. The add control slide rocks arm H which rocks key release bail I forward to move the latching slides forward, through the projections of slide J. When the hooked projections of the latching slides clear the depressed keystems, springs E restore the depressed keys to normal.

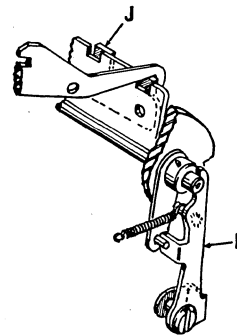


Fig. III-6

Detent K, which positions the key release ball at normal, establishes the correct relationship between the projections of slide J and the forward positions of the latching slides.

Releasing Motor Bars and Control Keys

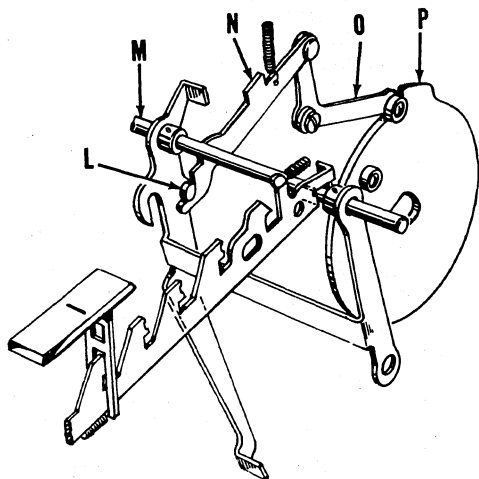


Fig. III-7

The accumulator control keys in columns "A" "B" and "C" are released at the approximate 320 degree point in the machine cycle, when cam P rocks arm O moving link N forward. Link N rocks restoring shaft assembly M, through stud L, to permit the shaft assembly to move the accumulator control key locking slides forward, through the forward formed ear on the rearward portion of the locking slides, thus releasing the depressed keys.

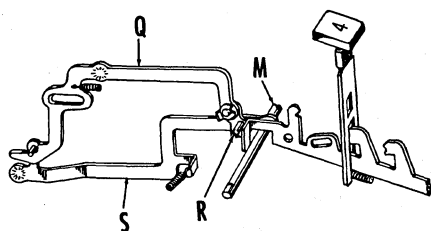


Fig. III-8

Motor bars Nos. 1, 3 and 4 are released when shaft assembly M moves link S forward. The stud in link S contacts the step of link Q to move the link forward and cam the locking slide in the motor bar column forward through stud R.

Control Key and Motor Bar Interlocks

To prevent incorrect manipulation of the control keys, safeguard against misoperation and prevent damage to the machine, interlocks are provided in the keyboard to ensure correct operation.

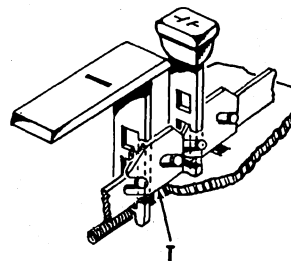


Fig. III-9

Interlocks T are used in the accumulator control key and motor bar columns to prevent the simultaneous depression of more than one key in the same column. When a key is depressed, the interlocks are cammed forward and/or rearward to prevent depression of other keys in the column. The interlocks control all keys except the Error and Repeat keys.

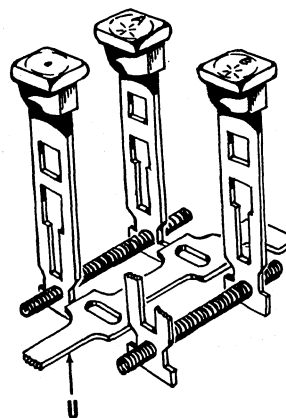


Fig. III-10

Interlock U, which is cammed sideways by the various total keys, prevents the simultaneous depression of accumulator "A", "B" and "C" total or subtotal keys.

ERROR KEY RELEASES KEYS AND RESETS DRIVE TRIP MECHANISM

The error key, when depressed, restores depressed keys (except date keys under control of the date repeat lever) and resets the drive trip mechanism when it is partially indexed.

Amount keys are released when the depres-

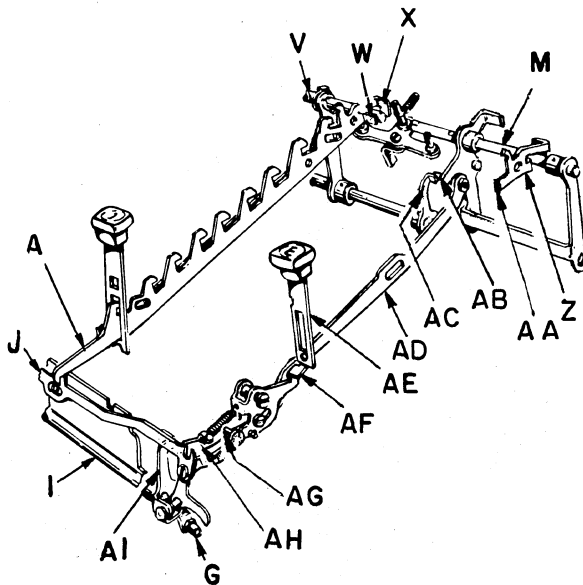


Fig. III-11

sion of error key AE swings lever AF, and, through pawl AH engaging the formed ear of arm AI rocks key release bail assembly I to move latching slides A forward, through slide J thus releasing the depressed keystems.

The accumulator control keys are released when lever AF moves link AD forward. Stud AB rock shaft assembly M forward to move the latching slides forward and release the depressed keys.

When amount keys and total or subtotal keys are depressed simultaneously or when a motor bar or control key is depressed when the carriage is out of a stop position, a partial indexing of the drive trip mechanism results.

The depressed keys are released when the error key is depressed rocking lever AF, which, through stud AG, rocks arm AI, bail assembly I and slide J to release the amount keys. Lever AF also moves links AD forward to rock shaft as-

semblies V and M through stud AB, thus releasing the control keys and resetting the drive trip mechanism.

Interlock Prevents Depression During Machine Cycle

To prevent premature release of indexed keys during the machine cycle, an interlock is provided to block depression of the error key until the drive trip mechanism is reset.

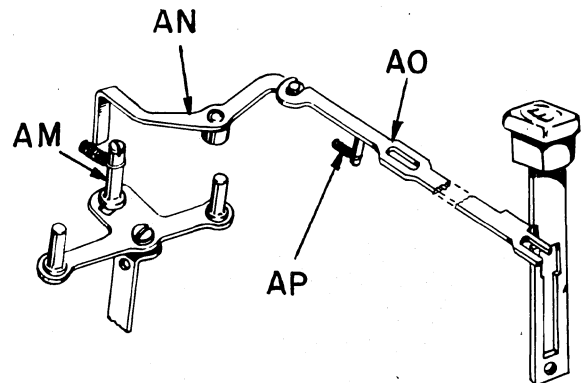


Fig. III-12

When a motor bar or control key is depressed to trip the drive, stud AM rocks lever AN to move interlock slide AO forward, positioning the projection of the slide into a cutout in the error key keystem, thus blocking depression of the error key during the machine cycle. When the drive trip mechanism is reset, spring AP restores the interlock slide to its normal rearward position.

THREE POSITION DATE REPEAT LEVER

Indexed date keys may be repeated during a posting run or restored after each machine operation - controlled by a three position date repeat lever. With the lever in its leftmost position, the date keys are released after each machine operation; with the lever in its center position, the month and year date keys repeat and the day keys are released; and, with the lever in its rightmost position, the day, month and year keys remain indexed and are repeated during subsequent machine operations.

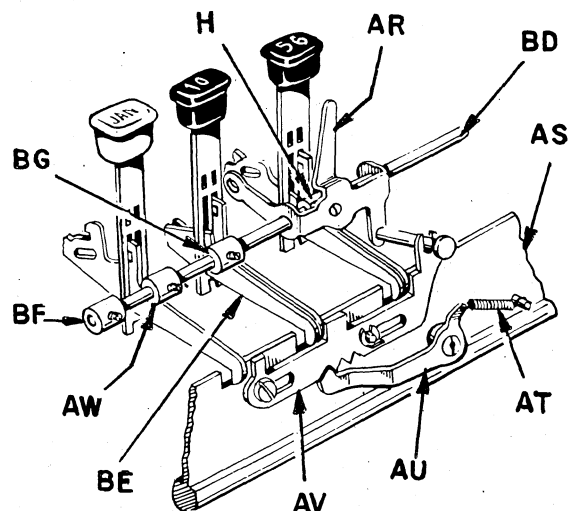


Fig. III-13

With date repeat lever AR located in its left-most position, collars BG, BH and AW are located to the left of the various locking slides, and month, day and year keys can be indexed. The date keys are restored during each machine operation through the upper projections of slide AV, which is rocked by the key release bail, to disengage the locking slides from the keystems.

When the date repeat lever is shifted to its rightmost position, slide AV is shifted to the right to move the projections of the slide out of alignment with the locking slides in the date columns. With the open spaces of key release bail AS in line with the locking slides, the release bail, when rocked forward during the machine cycle, does not contact the locking slides, and the indexed keys remain depressed. With the date repeat lever shifted to the right, collars BG, AW and BH are positioned in the paths of the locking slides in the date columns, thereby blocking the depression of month, day and year keys.

When the date repeat lever is located in its central position, the open spaces of key release bail AS and collars AW and BH are aligned with the locking slides in the month and year columns only, thus permitting keys in the days column to release during each machine operation.

Detent AU, through the tension of spring AT, retains slide AV and the date repeat lever in their indexed positions.

Tests and Adjustments

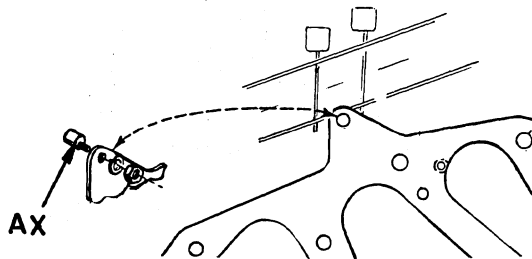


Fig. III-14

K7-1 With the keyboard placed on the machine and secured with the mounting screws, the lower plate of the keyboard should rest on eccentric screw AX.

TO ADJUST, turn eccentric screw AX.

REASON: To give added support to the right side of the keyboard.

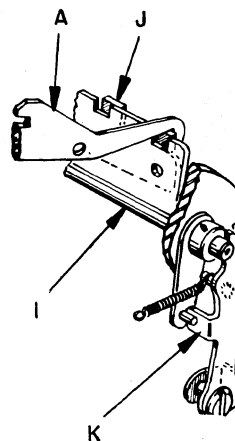


Fig. III-15

K7-2 With the machine normal, there should be .003" to .010" clearance between the front of slide J and the forward projection of latching slide A.

TO ADJUST, bend ear of K forward or rearward.

REASON: To establish the normal position for bail I which will ensure free cross-sliding of the slides attached to bail I.

K9-1 with bail assembly I held rearward there should be .010" to .025" passing clearance of ear AI over the step of latch AH.

TO ADJUST, bend upper ear of AI up or down as required.

REASON: To establish a normal position of AI with component parts.

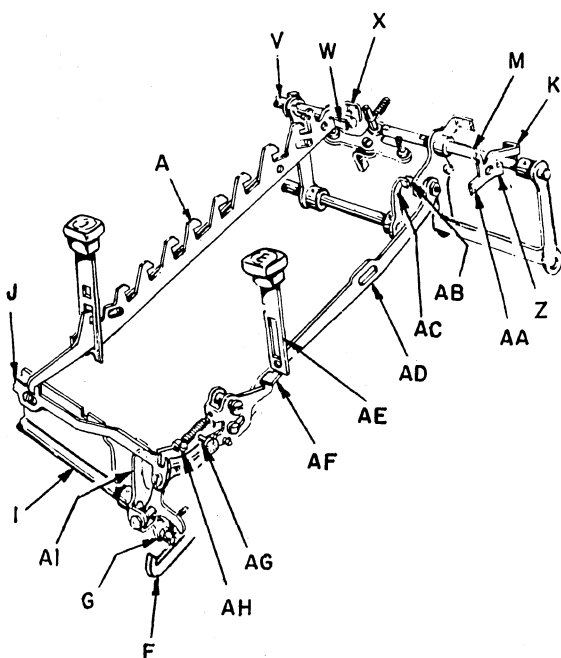


Fig. III-16

K9-2 Depress motor bar and hold bail I rearward against the arm of AF. There should be .013" to .020" clearance between slides J and latching slide A.

TO ADJUST, weave arm containing stud AG up or down.

REASON: To ensure free cross-sliding of J during a repeat of keyboard operation and positive release of slides A from any indexed keystem with AH inactive.

K9-3 With machine normal and error key depressed slowly, latch AH should travel .005" to .010" before contacting AI.

TO ADJUST, bend ear AI forward or rearward as required.

REASON: To ensure latching AH on AI when the drive is not tripped.

K7-3 With shaft V in its normal position, the hooked projections of latching slides A should have no less than a full hold on the keystems and should be located to allow easy depression of the keystems. On columns having double locking slide construction the locking slide must be adjusted to clear the front side of the keystems. Hold forward on the auxiliary locking slide and depress the keys to check for clearance between the keystems and locking slides.

TO ADJUST, bend formed ear W forward or rearward as required.

REASON: To establish the normal position of the locking slides and allow easy depression of the keystems.

K7-3A With shaft assembly M in its normal position, the hooked projections of locking slides AA should have no less than full hold on the keystems and should be located to allow easy depression of the control key keystems.

TO ADJUST bend formed ear Z.

REASON: To establish the normal position of the locking slides and allow easy depression of the control keys.

K7-4 With no keys indexed and the date repeat slide to the left, depression of a motor bar should trip the drive. There should be .003" to .008" clearance between lips X and shafts V and M. With all keys in the top row indexed (except result keys) and a motor bar depressed, the drive trip mechanism must be released.

TO ADJUST, bend lips X forward or rearward as required.

REASON: To prevent the locking slides from interfering with the release of the drive trip, while maintaining a full hold on the keystems.

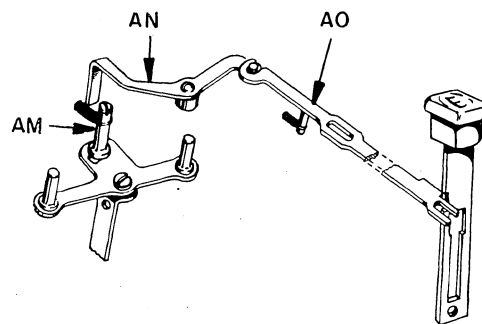


Fig. III-17

K7-5 With the first amount key in the last adding column and a total key depressed, the error key must not be blocked against depression.

TO ADJUST, bend the formed ear on bellcrank AN as required for clearance between interlock slide AO and the rear side of the error keystem.

REASON: To permit the release of indexed amounts on the keyboard from error key depression.

K7-6 With amounts indexed on the keyboard and a motor bar depressed to trip the drive, the error key must be blocked against depression.

TO ADJUST, recheck adjustment K7-5.

REASON: To prevent depression of the error key and the release of indexed keys during a machine cycle.

NOTE: Except F212, F5212, F2000 and machines having features "Carriage controlled lock on minus balance in crossfooter A" and "Error key depressible during repeat of machine operation."

K7-11 With the date repeat lever in the left position and with the top row of amount keys, date keys and the motor bar depressed, manually cycle the machine until add slide F reaches the limit of its rearward travel, which locates bail I in its forward position. All keys should be free to restore and depress without interference of the locking slides. Bail I should have additional movement when manually pulled forward to ensure proper functions.

TO ADJUST turn eccentric G.

REASON: To ensure the release of indexed keys from a machine operation.

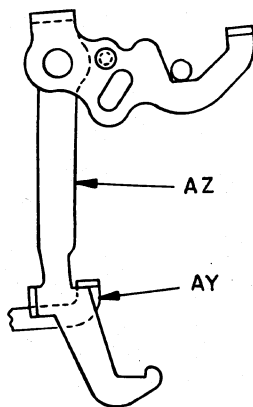


Fig. III-18

K7-7 With a motor bar or result key depressed and the ear of clutch release arm AY latched on step of bail AZ, due to an interlock holding AZ in home position, the error key should not be locked against depression.

TO ADJUST, bend the formed ear on bellcrank AN as required for clearance between interlock slide AO and the rear side of the error keystem. Recheck tests K7-5 and K7-6.

REASON: To permit the error key to restore a partially tripped drive.

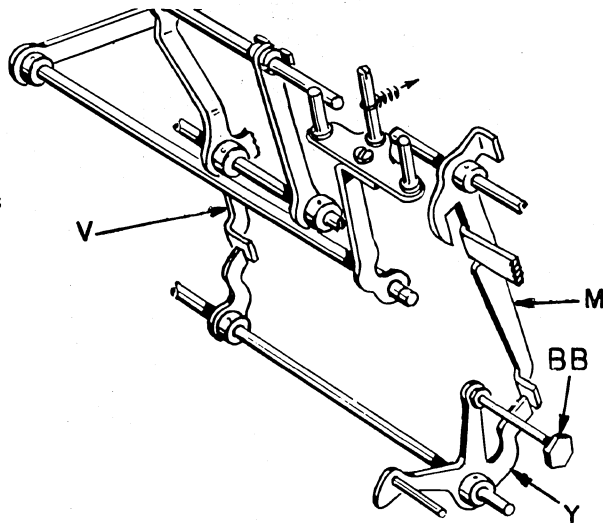


Fig. III-19

C19-2 With motor bar No. 1 depressed slowly, arm of assembly M should be released when the keystem nears the second step of the keyboard locking slide. Latch the motor bar on the second step of the locking slide and manually hold the lane 18 sensing bellcrank in a raised position. Release the interlock, unblocking the error keystem, and slowly depress the error key. There should be at least .003" passing clearance of the lower projection of assembly M over the arm of assembly Y.

TO ADJUST, turn eccentric post BB.

REASON: To ensure obtaining a repeat of motor bar No. 1 from the auxiliary motor bar repeat mechanism when selected from lane 18.

NOTE: MB3 and MB4 should release M from arm of Y when the keystem nears the second step.

C26-1 With Motor Bar No. 4 depressed, and M.B.R. bellcrank in lane 18 manually held in a raised position, depress the error key. There should be at least .003" clearance between the lower projection of assembly M and arm of assembly Y.

TO ADJUST, weave bellcrank contacted by MB4 keystem.

REASON: To ensure obtaining a repeat of Motor Bar No. 4 from the auxiliary Motor Bar repeat mechanism when selected from lane 18.

P11-4 With no amount keys, and each total key in turn depressed, the drive should trip, and the error key must be blocked against depression. With the clutch release arm AY manually held upward and a total key depressed, there should be .015" to .020" clearance between the ear of clutch release arm AY and the corner of the step on latch bail AZ.

With amount keys indexed on keyboard and a total key depressed, the drive should not trip and the error key must be depressible.

TO ADJUST, bend the long ears on the total key locking slides as required.

REASON: To ensure uniform machine functions from total key depression.

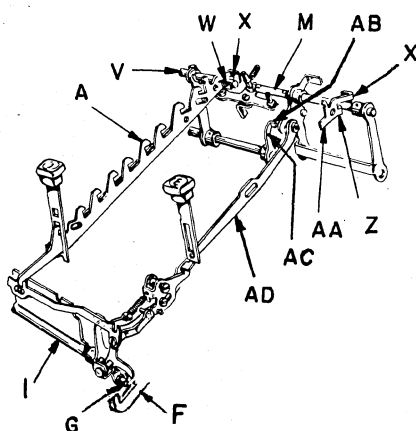


Fig. III-20

K9-5 With date repeat to the right and motor bars depressed, error key must reset bails V and M on arms Y with no less than .005" latching lead at the peak of throw.

TO ADJUST, turn eccentric AB in link AD for earlier or later reset of M and bend lip of AC for earlier or later reset of V.

REASON: To ensure resetting the drive.

K9-6 With the date repeat lever to the right, depress all columns of amount keys and CF "A" non-add key. Depress error key slowly and check amount keys to restore before M moves forward, then the CF "A" non-add key to restore before V and M reach their forward limits. Repeat with the "B" and "C" non-add keys.

TO ADJUST, bend ear Z forward or rearward to release non-add key before M reaches its forward limit.

REASON: To ensure an easier depression of the error key.

K7-12 With motor bar No. 1 depressed slowly until latched on the first step of the locking slide, depress motor bar No. 2. The drive should not trip and the motor bars should be restored by the depression of the error key. Repeat the above test with motor bars No. 3 and No. 2 then with motor bars No. 4 and No. 2. TO ADJUST, recheck K7-4.

REASON: To prevent a machine operation, which would result in a malfunction due to component parts indexed from partially depressed motor bars No. 1, No. 3 or No. 4.

K7-13 With a No. 1, No. 3 or No. 4 motor bar depressed, with the control panel removed to block drive trip, depression of the error key must position drive trip bails V and M to relatch before the locking slide releases the motor bar. TO ADJUST, recheck K7-4.

REASON: To ensure a positive relatching lead of the drive trip before the motor bars are restored to normal.

NOTE: After making the above adjustment, recheck tests K7-3A and K7-12.

K7-14 With the CF total key "A" depressed slowly until the first step of the locking slide is latched on the keystone, depression of motor bar No. 2 should not trip the drive. Motor bar No. 2 and total key "A" should be restored by the depression of the error key. Repeat the above using subtotal key "A" and motor bar No. 2. Repeat the above using subtract key "A" and motor bar No. 2.

TO ADJUST, bend the rearmost formed ear of locking slide AA for "A" control key column.

REASON: To prevent a machine operation which would result in a malfunction, due to component parts indexed from a partially depressed control key.

K7-15 Repeat test K7-14 using the "B" control keys in place of the "A" control keys.

K7-16 Repeat test K7-14 using the "C" control keys in place of the "A" control keys.

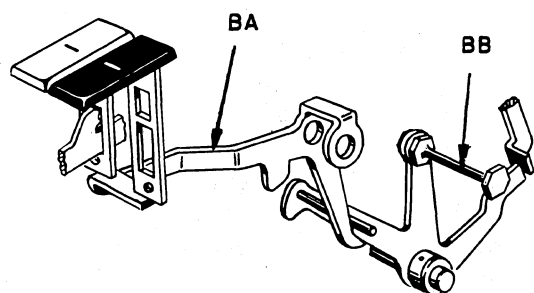


Fig. III-21

K7-17 With CF "A" subtract bar depressed slowly until the second step of the locking slide is fully latched in the subtract keystem, the drive should not be released. With a slight additional pressure on the subtract bar, the drive should be tripped.

TO ADJUST, bend lower rear projection of lever BA as required.

REASON: To provide the necessary time to position the component parts before tripping the drive.

K7-18 With CF "B" subtract bar depressed slowly until the second step of the locking slide is fully latched in the subtract keystem, the drive should not be released. With a slight additional pressure on the subtract bar, the drive should be tripped.

TO ADJUST, weave front projection of BA as required.

REASON: To provide the necessary time to position the component parts before tripping the drive.

K7-19 Repeat test K7-18 using "C" subtract bar in place of "B".

K7-20 With each total key "A", "B" and "C", in turn, depressed slowly until the second step of their respective locking slides is fully latched in the keystem, the drive should not be tripped. With a slight additional pressure on the total key, the drive should be tripped.

TO ADJUST, weave lip for total key "A", "B" and "C" which contact eccentric post BB.

REASON: To provide the necessary time to position the component parts before tripping the drive.

K7-21 With each subtotal key "A", "B" and "C" in turn, depressed slowly until the second step of their respective locking slides is fully latched in the keystem, the drive should not be tripped.

With a slight additional pressure on the subtotal key, the drive should be tripped.

TO ADJUST, weave lips on subtotal linkage which contacts eccentric stud BB.

REASON: To provide the necessary time to position the component parts before tripping the drive.

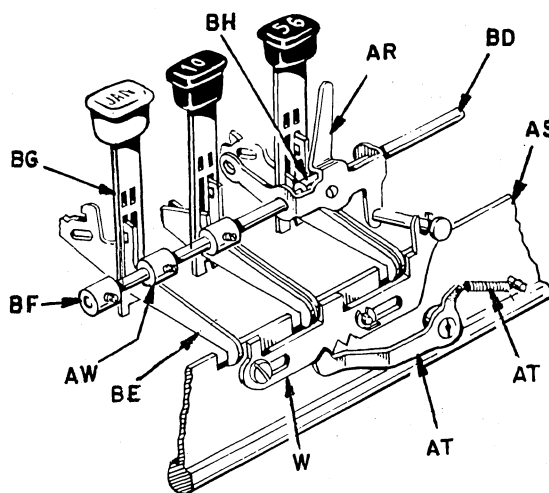


Fig. III-22

K11-1 With date repeat lever AR in its extreme left position, all date keys can be indexed and all date keys restore during a machine operation through the upper projections of slide AV. With the date repeat lever in its extreme right position, all date keys should be locked against restoring or depression.

TO ADJUST,

(a) Loosen the screw in date lever AR and shift date lever to the right.

(b) Secure collar BF flush with the end of shaft BD and move collar and shaft to the right until collar limits against keyboard side frame and tighten screw in date lever AR.

(c) Shift date lever AR to its left position and move collar AW to the left against keyboard side frame and tighten the screw in AW.

(d) Shift AR to its center position and move collar BG so that its right edge clears the left edge of the unit of days slide BE by .005" to .010".

REASON: To permit month and year, or month, day and year keys to remain indexed during continuous machine operation.

REPEAT OF KEYBOARD SETUP

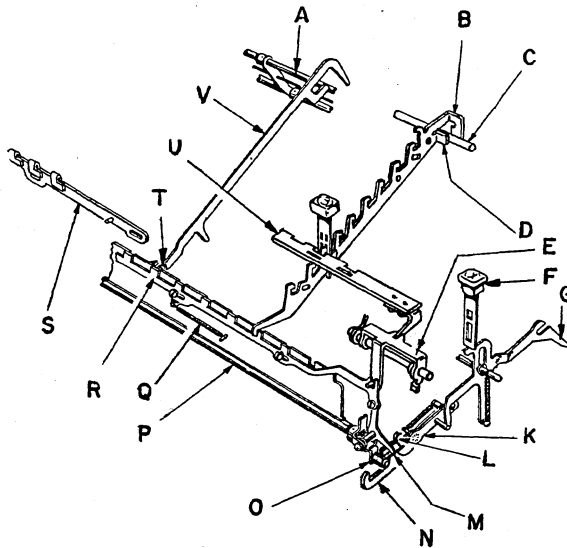


Fig. III-23

Indexed amount keys may be held depressed to repeat during a subsequent machine operation from depression of the repeat key. The repeat key keystem is notched so that it may be latched down to repeat the indexed amount during several machine operations. Carriage controlled totals and subtotals may be taken during repeat operations with keys depressed on the keyboard.

A keyboard controlled repeat of keyboard setup is accomplished when the depression of repeat key F swings lever G to cam slide K forward and position the forward portion of the slide under bellcrank M.

During the machine cycle, the rearward movement of the add control slide raises slide K rocking bellcrank M to shift the projections of slide R clear of locking slides B, thereby permitting indexed keys to remain depressed.

Link V is moved rearward by shaft assembly A to provide a positive rearward movement to key release bail assembly P, thereby insuring clearance between the projections of slide R and the keystem locking slides in columns in which no keys have been indexed.

Character keys in column 12 are repeated with amount keys in columns 1 through 11 through auxiliary slide S. Slide S is moved to the left to shift its projection clear of the locking slide in column 12 by slide R during a repeat operation, thus permitting indexed keys to remain depressed.

Repeat of Machine Operation or Repeat of Keyboard and Machine Operation Indexed by Carriage Controls

Carriage controls in lane 21 permit the machine operation or the keyboard and machine operation to be repeated in another stop position. A No. 8 control pin in lane 21 will index a repeat of machine operation so that when the carriage arrives at its next stop position, the machine will automatically operate to perform functions indexed by other carriage controls such as totals, subtotals, etc. A No. 5 control pin in lane 21 indexes repeat of keyboard and machine operation so that amounts indexed on the keyboard may be printed and/or accumulated in two or more stop positions in conjunction with other carriage controls. Total and subtotal functions may be obtained when amounts are being repeated on the keyboard.

Repeat Machine Operation

A No. 8 control pin in lane 21 provides a means of automatically indexing a machine operation in the next stop position to which the carriage moves. Early in the second machine cycle, the parts that were positioned from lane 21 control are released and restored to normal.

When bellcrank AD is rocked by a No. 8 control pin in lane 21, link AC is pulled rearward through spring AF to move projection W clear of the formed ear of bellcrank Y. This permits spring AK to rock bellcrank Y. Since shaft assembly Z has already been rocked to trip the drive, the step on the rear arm of bellcrank Y will be positioned in front of stud AA to prevent shaft assembly Z from latching the drive trip mechanism when it is restored near the end of the machine cycle. Therefore, when the carriage arrives at the next stop position, the drive trip mechanism will automatically trip the drive. Bellcrank AD is held in its rocked position by the formed ear of bellcrank Y.

Early in the second machine cycle, the high point of cam AB moves away from lever AG permitting the symbol indexing slides to drive lever AG forward. The upper stud AH moving forward rocks bellcrank Y through link AJ to raise the

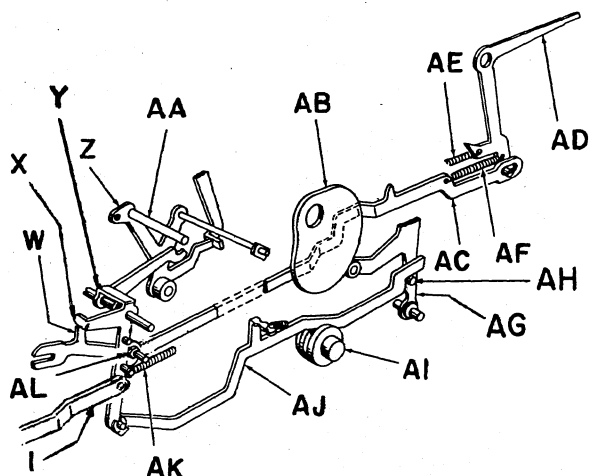


Fig. III-24

formed ear of bellcrank Y above projection W and to lower the rear arm of the bellcrank out of the path of stud AA. When the formed ear of bellcrank Y is raised above projection W, spring AE restores bellcrank AD and link AC to normal, positioning the projection under the formed ear of the bellcrank. This permits the drive trip mechanism to be latched in normal home position when restored near the end of the second machine cycle. As link AJ is moved forward, post assembly AI cams the link upward out of the path of stud AH to permit full movement of the symbol indexing slides. When lever AG is adjusted to accommodate the symbol indexing slides, stud AH should restore far enough to permit link AJ to move downward in front of the stud.

Repeat Keyboard and Machine Operation

Amount keys indexed on the keyboard may be repeated during a subsequent machine operation when lane 21 has been indexed by a No. 5 control pin. The No. 5 control pin, being longer than a No. 8 control pin, indexes repeat of machine operation in exactly the same manner as previously explained and also indexes repeat of keyboard in a manner similar to the repeat key.

A No. 5 control pin in lane 21 pulls link AC rearward, causing eccentric stud AL to rock lever G. The forward end of lever G moving downward

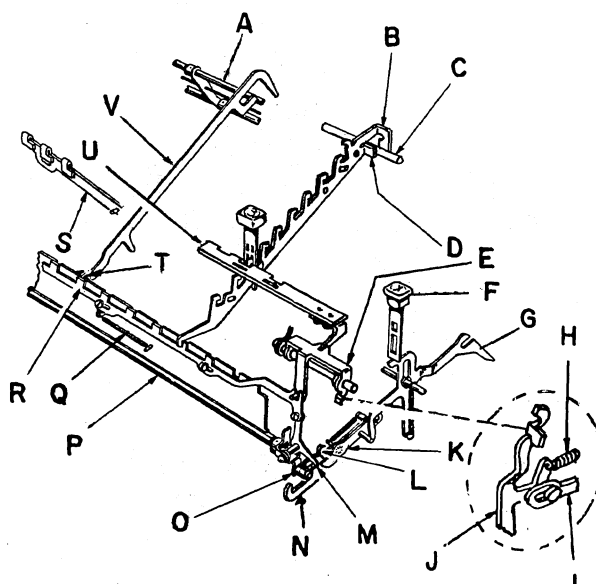


Fig. III-25

cams slide K forward, underneath bellcrank M. As add meshing control slide N moves rearward during the machine cycle, slide K is raised to move slide R out of the path of locking slide B. This prevents the key restoring bail from disengaging the locking slides from the depressed key-stems during the machine cycle.

Slide U in the keyboard prevents indexing a different amount on the keyboard during a carriage controlled repeat of keyboard. Cutouts in slide U normally are aligned with locking slides B to permit the indexing or restoration of amount keys. When slide U is moved to the left by slide R and bail E, the cut-outs of slide U are moved out of alignment with the locking slides, thereby preventing depression of an amount key during the machine cycle. As bail E moves to the left, arm J moves rearward under tension of spring H to block bail E and hold slide U in its blocking position.

The keyboard repeat mechanism will be restored by spring Q early in the second machine cycle when bellcrank Y moves link I forward to release bail E. Since the keyboard repeat mechanism is released early in the machine cycle in which the keys are to be restored, the key restoring bail should be rocked far enough to permit slide R to restore behind the locking slides of columns that do not have keys depressed.

Tests and Adjustments

K8-1 With the repeat key latched down and the motor bar depressed, manually cycle the machine until shaft C reaches its maximum forward travel and blocking slide U is positioned to block the forward movement of locking slides B. There should be .003" to .005" movement of the locking slides between blocking slide U and shaft C.

TO ADJUST, bend ears D.

REASON: To ensure free cross-sliding of the blocking slide during a repeat of keyboard operation.

NOTE: Check adjustment K7-3.

K8-2 With the date repeat lever to the right, the repeat key latched down and the motor bar depressed, manually cycle the machine until slides R and S are moved to the left and bail P reaches its maximum forward travel. The projections on slides R and S should clear the slots in bail P and slide U should block the listing keys against depression.

TO ADJUST, weave lever L to tilt roller up or down.

NOTE: If necessary, weave the horizontal projection of bellcrank M up or down.

REASON: To prevent restoring or depression of add keys during a repeat of keyboard operation.

K8-3 With the date repeat lever to the left, repeat key latched down and all keys in the top row depressed, depress the motor bar and manually cycle the machine until the add control slide reaches its maximum rearward travel. The keys in the month, day and year columns should restore and be free to depress without touching the locking slides. Amount keys should be blocked by the locking slide and the character keys should be flexible.

TO ADJUST, turn eccentric O.

NOTE: Recheck adjustment K7-11.

REASON: To ensure release of indexed keys in the month, day and year columns and to prevent excessive forward movement of bail P.

K8-4 With the repeat key latched down, slide K should have a full hold under bellcrank M.

TO ADJUST, weave the horizontal projection of

bellcrank M forward or rearward.

P15-1 With the machine normal, ear X should have a full hold on projection W.

TO ADJUST, bend ear X.

REASON: To prevent a repeat of machine operation when not indexed by a control pin in lane 21.

REASON: To ensure the repeat of the keys indexed on the keyboard.

P15-2 With a repeat of machine operation indexed by a control pin in lane 21, ear X should drop in front of projection W.

TO ADJUST, bend ear X.

NOTE: After adjusting, recheck P15-1.

REASON: To ensure release of bellcrank Y and to hold link AC in its rearward position when bellcrank AD is released from the latch plate.

P15-3 With a repeat of machine operation indexed and the drive tripped, manually rotate camshaft to 120°. The step on bellcrank Y should be positioned to block stud AA.

TO ADJUST, recheck adjustment P15-1 and P15-2.

REASON: To prevent resetting the drive when repeat of machine operation is indexed by a control pin in lane 21.

P15-4 NOTE: With the drive tripped, manually raise bellcrank AD until the ear X drops in front of W; manually cycle machine until link AJ is driven to its extreme forward position by stud AH, lip X should be raised to clear W by at least .003". Manually raise bellcrank AD to latch on the latch plate and complete the machine cycle, link AJ should return to its normal position in front of stud AH.

REASON: To permit AJ and AC to restore to normal position and hold Y inactive.

K9-4 With the date repeat slide to the left, depress the total key and turn main camshaft until shaft A reaches its rearward limit of travel.

Link V should position bail P so that R and S clear strips B.

TO ADJUST, turn eccentric T as required.

REASON: To ensure free cross-sliding of R and S during repeat of machine operation.

NOTE: Some machines do not contain screw T. A screw is used to attach V to P.

INDEXING AMOUNTS TO PRINT AND ACCUMULATE

The keyboard indexing mechanism provides a means of limiting adding rack and type bars which correspond to amounts indexed in the keyboard, thereby indexing amounts to print and accumulate.

This subject covers only the indexing of amounts. The operation of the printing and accumulation mechanisms is covered elsewhere under separate headings.

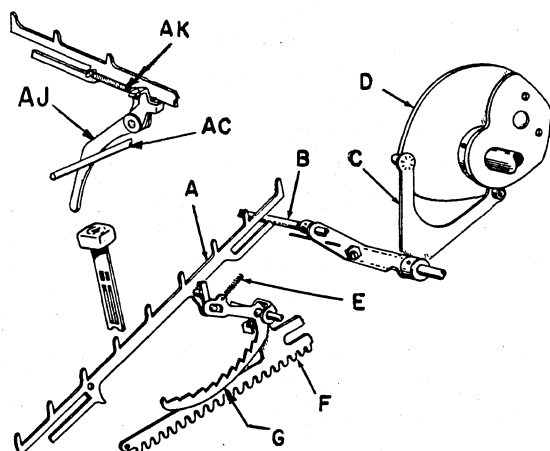


Fig. III-26

When amount keys are depressed, the lower projections of the depressed keystems are positioned in the paths of the projections of index strips A.

Early in the machine cycle, rotation of cam assembly D on the main camshaft swings shaft assembly B rearward, through lever C, permitting springs E to move the index strips rearward to limit on the depressed keystems and swing corresponding steps of index racks G into the paths of the formed ears of the various adding racks F.

Spring AK holds nylon arm AJ in contact with shaft AC to prevent a rebound of rack A when A is moved to index position.

When index racks G are at normal, the foremost step of each (9 position) is located in the path of the formed ear of its corresponding adding rack; when no amount keys are depressed the rearmost step of each index rack (0 position) is swung into the path of the formed ear of its corresponding adding rack.

Shaft I, which ties the two index strip guide combs together, prevents the index strips from disengaging from the guide combs. Without the

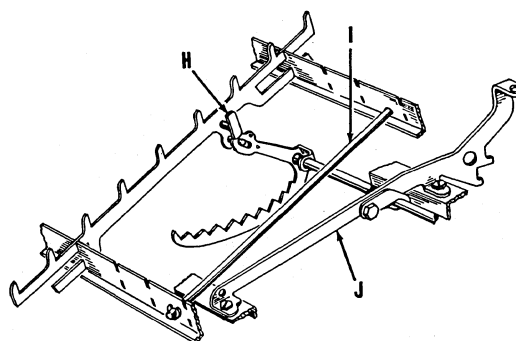


Fig. III-27

tie shaft, this could occur when the springs on the index racks move the index strips rearward to their limit (with no keys depressed), which would tend to bow the upper guide comb rearward and permit the lower forward projections of the index strips to become disengaged from their slots in the front guide comb.

Brace J stabilizes the index rack shaft assembly, thus preventing the shaft assembly from bowing when the formed ears of the adding racks limit on the steps of the index racks.

Turn studs H are positioned outside the arms of the index racks to prevent the index racks from becoming disengaged from the studs on the index strips.

Moving the Adding Racks Forward

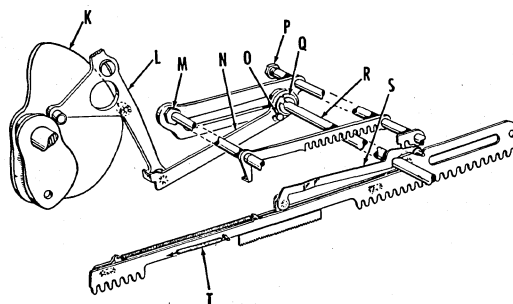


Fig. III-28

As the operation continues and reaches the approximate 97 degree point in the machine cycle, cam assemblies K on the right and left ends of the camshaft rock levers L to move adding rack actuating shaft R forward through links N. Forward movement of the actuating shaft causes the adding racks to move forward through latch assemblies S and springs T. As the adding racks move forward the auxiliary racks on latch assemblies S raise the type bars into printing position.

Raising the Type Bars

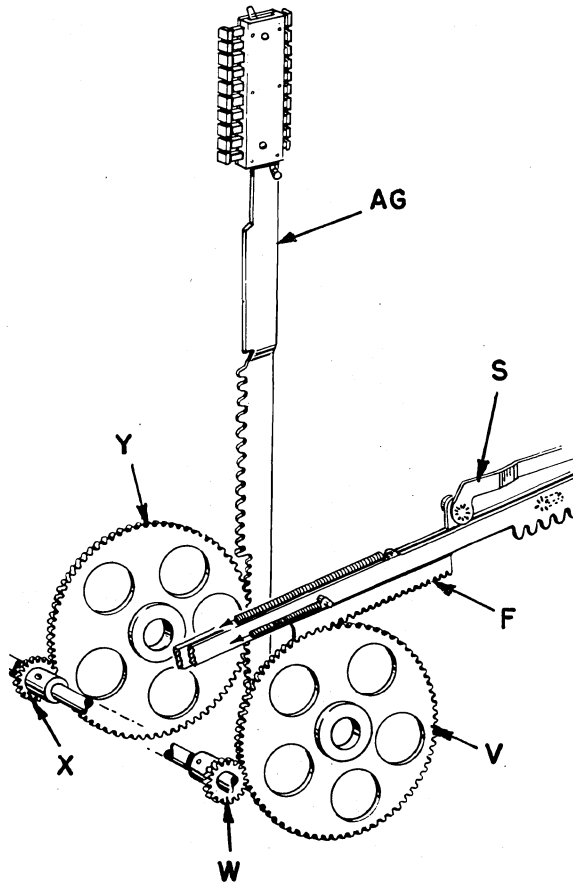


Fig. III-29

As the adding racks move forward, racks F of latch assemblies S rotate gears V to effect the corresponding rotation of gears Y through intermediate gears W and X, thereby raising the type bars into printing position.

The yielding connections between the adding racks and the adding rack latch assemblies provide visible printing by enabling the type bars to be lowered below the printing line when they are restored to normal and provides a means of moving the adding racks forward and rearward.

DATE		YR	CHARACTERS, REFERENCE, AND AMOUNTS															SYMBOLS			
	DATE	YR																			
PRINTING POSITIONS																					
18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	S1	S2	S3	S4

Fig. III-30

The preceding illustration shows the positions of the type bars, hammers, etc., in the Printing Section. This is necessary for reference purposes since, in the Sensimatic machine, the printed columns may, or may not, have the same relative positions as the keyboard columns in which the figures were indexed; for example, (1) characters may be indexed in keyboard column 11 and printed in position 12, and (2) characters may be indexed in keyboard column 12 and printed in position S-2.

The amount and date positions are numbered from right to left, beginning with printing position 1 for the units of cents column which is indexed from keyboard column 1. The symbol columns are numbered from left to right, beginning with printing position S-1 for the accumulator "A" symbols.

Locking the Adding Racks in Indexed Positions

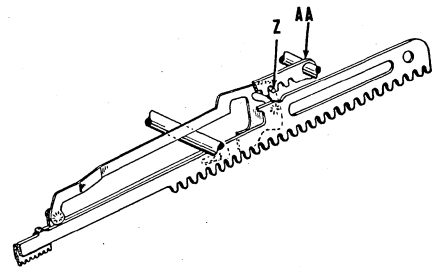


Fig. III-31

When the adding racks limit on the steps of the index racks, the yielding connections between the adding racks and the latch assemblies permit the actuating shaft to move the latches forward and upward to locate studs Z into a tooth space of lock plates AA and permit the actuating shaft to continue its forward movement. The lock plates provide a means of locking the adding racks in their indexed positions to permit restoring the depressed keys, index strips and index racks early in the machine cycle.

Restoring the Adding Racks to Normal

When the operation reaches the approximate 130 degree point, the index strips and index racks are restored to normal; and at the approximate 197 degree point the actuating shaft is moved rearward to restore the adding racks and type bars to normal.

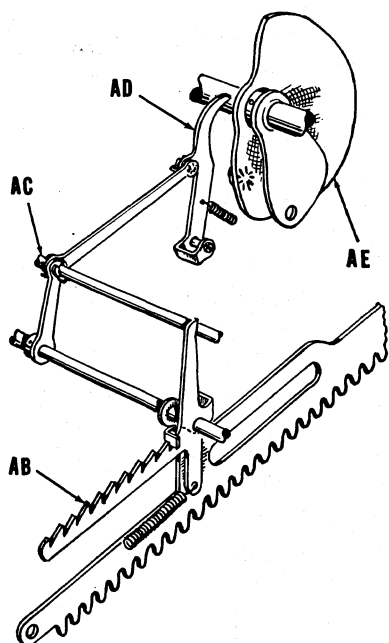


Fig. III-32

Sector locks AB prevent the adding racks from moving forward when the studs in the adding rack latches are cammed out of the lock plates as the adding rack actuating shaft moves rearward.

The sector locks are moved out of the paths of the formed ears of the adding racks, early in the machine cycle, when the roll on cam AE rocks lever AD to swing shaft AC forward, thus lowering the sector locks out of the paths of the formed ears of the adding racks to permit the adding racks to move forward. The sector locks are moved back into the path of the adding racks at their approximate 153 degree point, which is prior to the time the actuating shaft starts moving rearward.

Tests and Adjustments

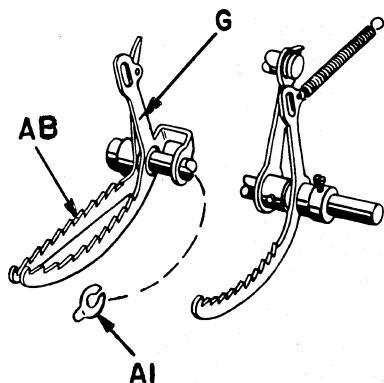


Fig. III-33

A27-1 With the machine at normal, all index racks G and all sector locks AB should be parallel with calendar feature racks, character racks and add racks.

TO ADJUST, bend index racks G and/or sector locks AB as required.

REASON: To ensure parallel alignment of index racks G and sector locks AB with calendar feature racks, character racks and add racks.

A27-2 Index racks G and sector locks AB must be free in all columns with no more than .020" overall side play and also must provide at least a full side hold of their steps with the formed ears on calendar feature racks, character racks, and add racks.

TO ADJUST,

A. For calendar feature and character columns: Assemble clip(s) AI over the shaft next to the left side of the last index racks G.

B. For add columns: Assemble clip(s) AI over the shaft next to the right side of the first index rack G.

REASON: To ensure at least a full side hold of the steps of index racks G with the formed ears on calendar feature racks, character racks and add racks when they are indexed.

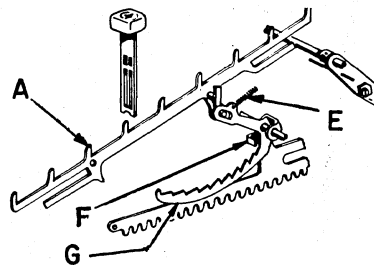


Fig. III-34

K7-8 With the machine normal, depress all amount keys in position nine. Depress the motor bar and manually cycle the machine until lips of the add racks F are in the No. 9 step of index racks G. Lips on rack F should clear the No. 8 step of the index racks by no less than .010" and have no less than a 2/3 hold on the No. 9 step of the index racks. Repeat the above test for keystems in position 8, 7, 6, 5, 4, 3, 2 and 1.

Repeat the above test for keys in character and calendar feature columns.

TO ADJUST, weave lower projection of the keystems forward or rearward as required.

REASON: To ensure correct indexing of the adding racks F from the keyboard.

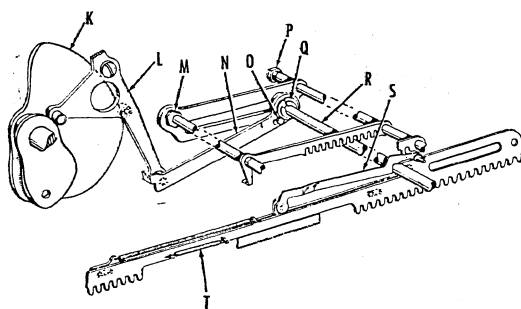


Fig. III-35

A7-1 With No. 6 rollers installed on the rear posts of right and left drive arms L, there should be .003" to .005" play between the rollers and right and left cams K.

TO ADJUST, replace front rollers with the correct size roller, from No. 1 to No. 6.

NOTE: If test cannot be obtained with No. 1 through No. 6 rollers at the front, replace the No. 6 rollers at the rear of the drive arms with the next smaller size.

REASON: To prevent erratic motion in drive arms L and maintain the proper adjusting range of eccentric bushings Q.

A7-2 There should be no bind between front and rear rollers or arms L and cams K when the main camshaft is rotated through a complete cycle; and no more than .010" play when rear rollers are on the rises of the cams.

TO ADJUST, recheck adjustment No. 1.

REASON: To ensure free operation of the machine and prevent erratic motion of drive arms L.

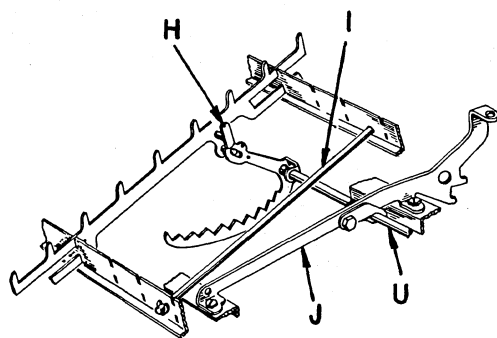


Fig. III-36

A7-3 With the machine cycled until the formed ears of adding racks F are limited by index racks G, braces J should prevent weaving of shaft U.

TO ADJUST, with the machine normal, position braces J to support, but not bow, shaft U. REASON: To maintain the correct position of shaft U; and to ensure a correct mesh of the accumulator pinions with the adding racks and entry of the adding rack studs into the lock plates when the formed ears of the adding racks are limited by the index racks.

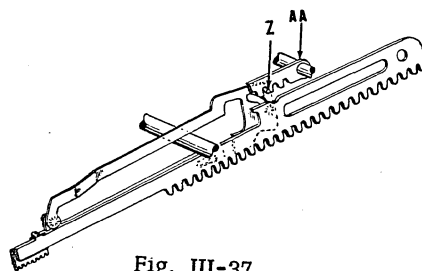


Fig. III-37

A7-4 Stud Z on rack latches S should engage the tooth spaces of lock plates AA in positions 8 and 0 with .001" to .003" clearance between the top of the studs and the tooth spaces.

TO ADJUST, turn eccentrics M.

REASON: To provide positive detenting of the adding racks in their actuated positions.

A7-5 Remove index strips A and unhook springs E in the first and last adding columns. With racks G manually raised in these columns, there should be .010" to .012" clearance between the cipher steps of racks G and the formed ears of adding racks F.

TO ADJUST, turn eccentrics Q.

REASON: To establish the normal position for the adding racks which will permit a free mesh with the accumulator pinions.

A7-6 With the machine manually operated during a clear plus total operation (the long teeth of the accumulator pinions limiting on the total stop bail) to 120°, studs Z on adding racks F should be free in the tooth spaces of lock plates AA.

TO ADJUST, loosen the nuts P and allow the lock plate assembly to align with studs Z.

REASON: To ensure free entry of studs Z into the tooth spaces of lock plates AA.

See RIN
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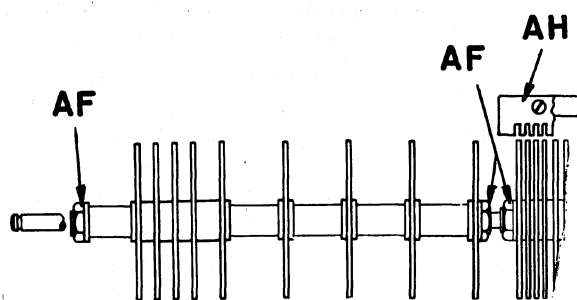


Fig. III-38

PR6-1 All gears of the cluster gear unit should be free and align with their corresponding parts.

TO ADJUST, reposition partition plates.

REASON: To ensure free action and alignment of parts.

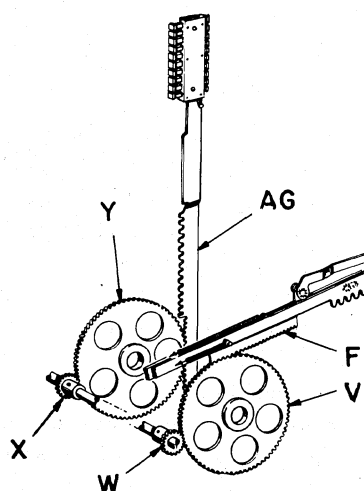


Fig. III-39

PR6-2 Gears V should have a full hold on add racks F the full travel of the racks.

TO ADJUST, loosen nuts AF and move section as required.

REASON: To ensure constant mesh of gears V and add racks F.

PR6-3 Gears W and X should have a full hold on gears V and Y.

TO ADJUST, recheck PR6-2.

REASON: To ensure raising of the type bars when add racks are moved.

PR6-4 Type bars AG should have no less than 3/4 hold on gears Y.

TO ADJUST, locate guide comb AH as required.

REASON: To ensure constant mesh of gears Y and type bars AG.

PR6-5 Guide comb AH should be as far forward as possible constant with free movement of the type bars.

TO ADJUST, locate comb AH as required, recheck PR6-4.

REASON: To provide maximum depth mesh of the type bars and gears.

MOTOR BAR REPEAT INDEXED BY CARRIAGE CONTROL

Motor bar repeat, indexed by a No. 5 control pin in lane 18, provides a means of repeating the functions of the motor bar by preventing the motor bar from restoring at the end of the machine cycle. Lane 18 is used in conjunction with motor bar No. 1.

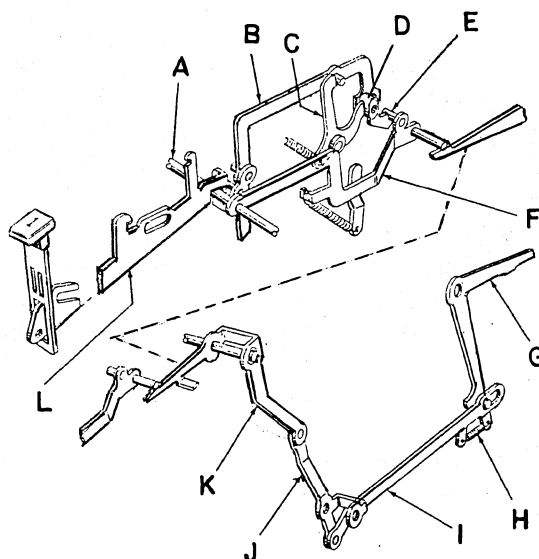


Fig. III-40

When motor bar No. 1 is depressed and the drive is tripped, locking slide L moves rearward to retain the motor bar in its indexed position. During the machine cycle, a No. 5 control pin in lane 18 rocks bellcrank G so that the bellcrank may be latched by a latch plate. As the bellcrank rocks, spring H, link I and lever J rock bail K causing the forward arm of the bail to lift link F. This raises stud E above the step of slide B so that as shaft assembly A moves forward near the end of the machine cycle, stud E moves

over the step of slide B. Therefore, slide B is not moved forward and motor bar locking slide L retains motor bar No. 1 in its depressed position so that another machine cycle is indexed and the functions of the motor bar are repeated in the next stop position.

Tests and Adjustments

P8-1 With the machine normal, there should be .003" to .006" clearance between stud E and the vertical side of the lower step of slide B.
TO ADJUST, turn elongated limit D.

REASON: To permit stud E to reset behind the step of slide B following a repeat of motor bar No. 1 operation.

P8-2 With a No. 5 control pin active in lane 18 and the machine cycled to approximately 315° , stud E should clear the upper step of slide B with no less than .010" clearance.

TO ADJUST, weave bail K.

REASON: To ensure repeat of auxiliary motor bar No. 1.

Burroughs
SERIES F25 - F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F 700 and F 5000)

INSTRUCTION BOOK

Section IV



MECHANISMS AND ADJUSTMENTS
PRINTING

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PRINTING

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PRINTING MECHANISMS

Amounts that are indexed on the keyboard, or amounts that have been accumulated, are printed by the printing mechanisms which drives the type against the platen to print the amount on the forms or roll paper.

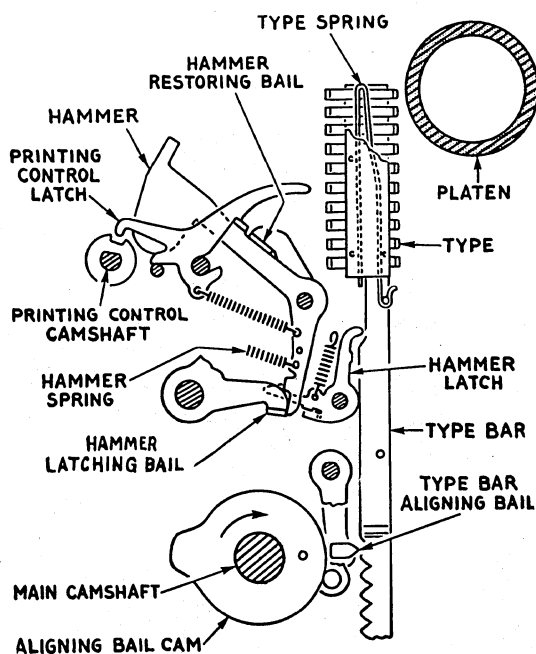


Fig. IV-1

Early in the machine cycle, rotation of the main camshaft moves the hammer restoring bail rearward out of the path of the hammers and expands the hammer springs. When the adding racks raise the type bars beyond cipher position, through the cluster gear unit, the hammer latches are rocked clear of the hammers. Further rotation of the camshaft rocks the hammer latching bail clear of the hammers, allowing the hammer springs to drive the hammers against the type to

print the amount. The hammers are restored by the hammer restoring bail and are latched in normal position by the hammer latching bail.

The aligning bail, which aligns the type bars prior to release of the hammers, is rocked into notches in the type bars by a cam on the main camshaft.

Ciphers are automatically printed to the right of indexed amounts through overlapping tails on the hammer latches and a cipher is printed to the left of the units of cents column when no amount is indexed in the tens of cents column. During total and subtotal operations, if the machine is clear, ciphers are printed in the first two columns to indicate that the machine is clear.

Since the ribbon is normally below the printing line, the black portion of the ribbon is raised into printing position during each machine operation. The red portion of the ribbon is shifted into printing position from depression of the subtract bars or from a minus balance operation.

The mathematical functions of the machine, such as adding, subtracting, non-adding, and totaling are identified by appropriate symbols that are printed to the right of amounts. A separate set of symbols is indexed for each accumulator.

The printing control latches which are controlled by the nine position printing control camshaft provide a variety of printing control combinations.

This subject covers mechanisms involved in printing, feeding and reversing the ribbon, shifting the ribbon to print in red, and printing symbols and a clear signal.

The printing sections of the dual printer are identical. The printing control camshafts are controlled from separate sensing lanes to obtain the desired flexibility. The main camshaft is extended to provide additional cams for operation of the left head.

PRINTING THE INDEXED AMOUNT

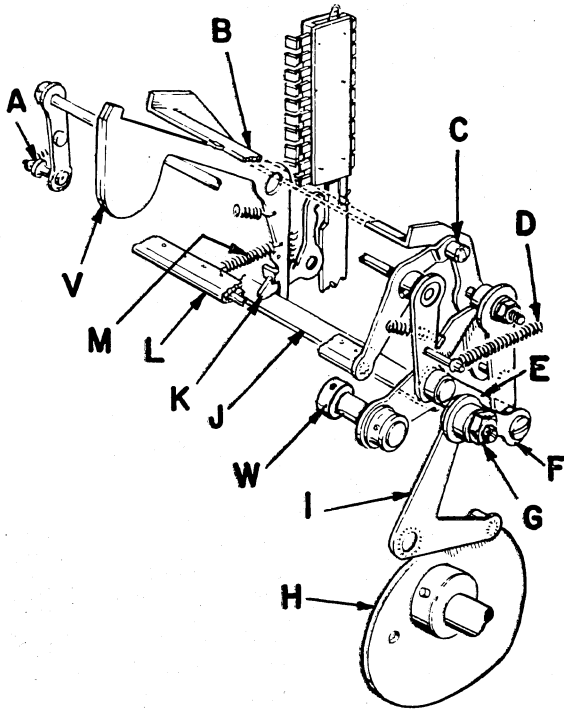


Fig. IV-2

Early in the machine cycle, cam H on the main camshaft rocks lever I to swing bail assembly L forward, through links F and E, thus expanding hammer springs M. Link E also swings restoring bail B rearward out of the path of the hammers. When the type bars are raised beyond cipher position, the inclined surfaces of the type bars rock latches K clear of the lower formed ears of the hammers. As the operation reaches the approximate 167 degree point in the machine cycle, eccentric C on bail assembly L rocks bail J downward out of the path of the hammers to permit springs M to drive the hammers against the type and print the indexed amounts.

The hammers are restored to normal by springs A and D which rock bail assembly L and, through link E, rock restoring bail B forward. The hammers are latched in normal position by bail J and latches K.

Ciphers are printed to the right of indexed columns by means of overlapping tails on latches K. If it is desired to prevent indexing a print to the right, such as between date and amount columns, the overlapping tail is omitted, thus providing a split.

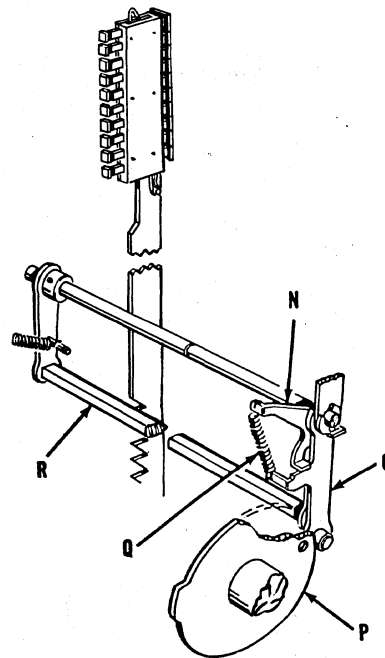


Fig. IV-3

Aligning bail R, which aligns the type bars prior to release of the hammers, is rocked into the notches of the type bars when cam P on the main camshaft rocks arm O rearward. Spring Q and arm N provide a yielding connection between the aligning bail and the cam.

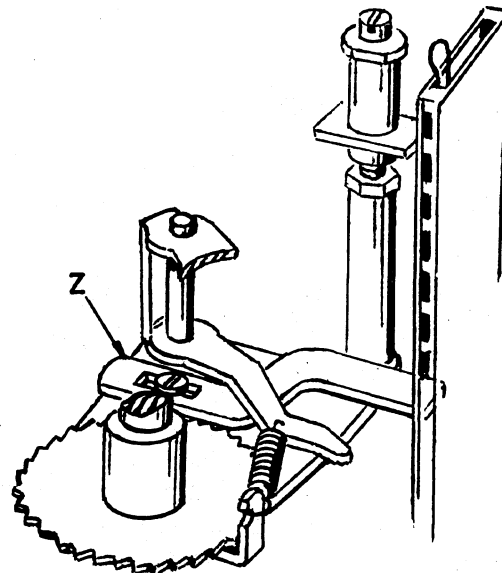


Fig. IV-4

Brace Z prevents vibration of month type sector to ensure a vertical alignment of the sector.

Tests and Adjustments

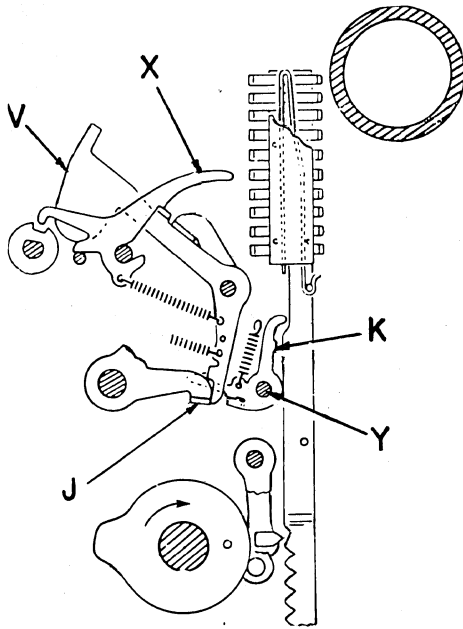


Fig. IV-5

PR7-2 The striking surface of hammers V should align squarely with the type.

TO ADJUST, weave hammer V as required.

REASON: To ensure full impact of hammers V on the type.

PR7-3 NOTE: With a full hammerblock selected and hammers V released from bail J, latches X should have at least a 1/3 hold on the formed ears of hammers V.

PR7-4 Latches X should have a full lateral hold on the ears of hammers V.

TO ADJUST, weave latches X as required, maintaining clearance between latches X and hammers V in both the normal and fired positions.

REASON: To provide positive hold of latches X on hammers V and to ensure free action.

PR7-5 With latches K in normal position and hammers V released from bail J, latches K should have at least a 1/2 hold on the lower ears of hammers V.

TO ADJUST, with hammers V in a fired position loosen nuts on the ends of shaft Y and position shafts Y as required and retighten the nuts.

REASON: To ensure blocking hammers V when the type bars are not indexed.

PR7-7 Forward motion of a latch K should provide immediate movement of the latch to its immediate right, except in cipher split position.

TO ADJUST, weave the crossover tails on latch(s) K.

REASON: To ensure printing of ciphers to the right of an indexed amount.

PR7-10 With the machine normal, there should be .010" to .025" clearance between the tails of hammers V and bail J.

TO ADJUST, turn eccentric G.

REASON: To ensure reset lead of the hammers.

PR7-11 With the machine cycled manually, hammers V should be released from bail J at 166° to 169°.

TO ADJUST, turn eccentric C.

REASON: To time the release of the hammers in relation to component parts.

PR7-12 Hammer latching bail J should be free and have no more than .005" lateral play.

TO ADJUST, with the bail assembly shifted to the left, place a .005" gauge between collar W and the right sideframe of the printing section. Move collar W against the gauge and tighten the set screw.

REASON: To ensure alignment and freedom of component parts.

PR7-16 With hammers V in a normal position, they must not limit against the ribbon reverse slide.

TO ADJUST, recheck PR7-10.

REASON: To allow simultaneous release of all indexed hammers.

PR7-17 Cycle the machine under power to print the following sequence of figures. Each column must be in correct vertical alignment and must be spaced correctly.

DEC 26 6' 999999,999,999.99+LS+

JAN 11 5' 111111,111,111.11-IN-

DEC 26 6' 999999,999,999.99+LS+

JAN 11 5' 111111,111,111.11-IN-

DEC 26 6' 999999,999,999.99+LS+

JAN 11 5' 111111,111,111.11-IN-

DEC 26 6' 999999,999,999.99+LS+

JAN 11 5' 111111,111,111.11-IN-

TO ADJUST, straighten the type bar(s) by weaving below the magazine.

Recheck adj. PR7-2, PR7-3, PR7-4

REASON: To have type in vertical alignment.

PR7-18 NOTE: Cycle the machine under power and print all rows of add keys, date keys, register keys and symbols. All type should be free and square and print with equal density and have no more than .020" variation on their horizontal alignment.

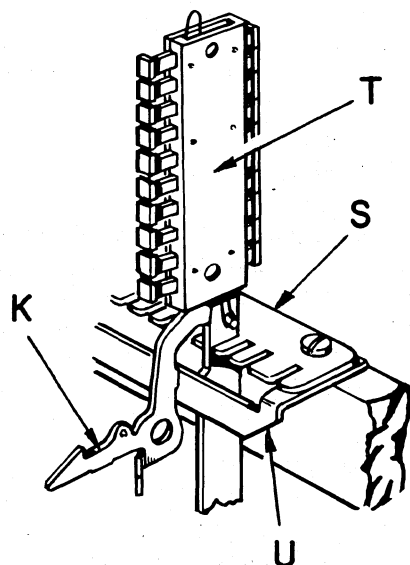


Fig. IV-6

PR15-1 There should be .003" to .005" play of the type bars T between the rear of slots in comb S and the front of guide plate U.

TO ADJUST, locate comb S as required.

REASON: To ensure that the type bars will be free when indexed and at normal position.

PR15-2 Type bars T should align with hammer latches K with a full hold.

TO ADJUST,

A. For the majority of type bars shift comb S laterally as required.

B. For individual type bar alignment bend hammer latches K as required.

REASON: To ensure proper alignment of type bars and hammer latches.

NOTE: Recheck test PR15-1.

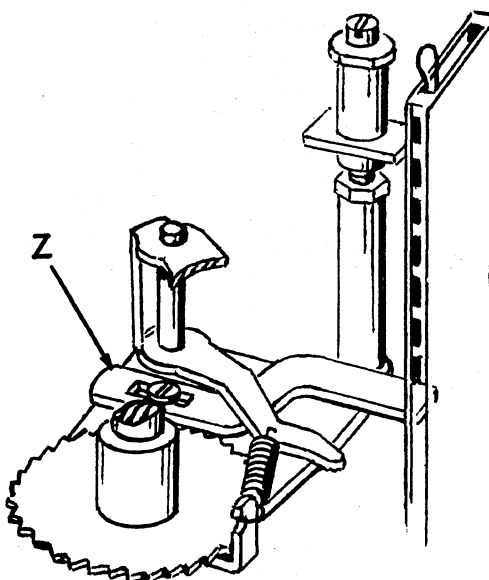


Fig. IV-7

PR14-3 There should be .001" to .003" clearance between brace Z and the month type bar.

NOTE: This clearance should be observed on both sections of machines with dual printing heads.

FEEDING AND REVERSING THE RIBBON

The ribbon feed and reverse mechanisms provide maximum life of the ribbon fabric and a uniform print by crossfeeding the ribbon during each machine operation and by automatically reversing the direction of the crossfeeding when the ribbon is unwound from either spool.

Feeding the Ribbon

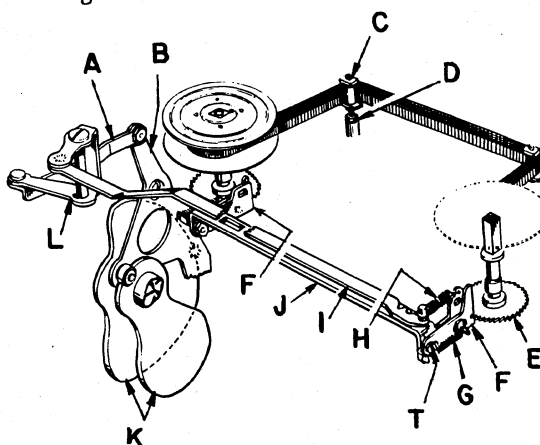


Fig. IV-8

The ribbon is crossed by the active feed pawl F which revolves ratchet E when cam assembly K rocks arm B, link A and arm L to move slide J sideways through slide I. Spring H holds a pocket of slide I engaged with the stud in slide J and provides a yielding connection to enable reversing the direction of the ribbon crossfeeding.

The elongated slots in feed pawls F permit the feed pawls to idle across the teeth of the ratchets in the inactive direction, and springs G hold the feed pawls against the ratchets to permit feeding the ribbon when the ribbon feed slides are moved in the active direction.

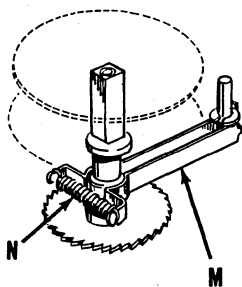


Fig. IV-9

Ribbon brakes M and springs N provide sufficient tension on the ribbon to insure a uniform feed and a prompt reversal of the ribbon feed.

Reversing the Ribbon

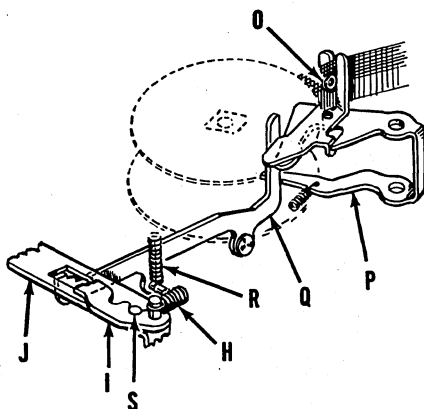


Fig. IV-10

When the ribbon is unwound from either spool, button stud O swings bail P clear of detent arm Q. This permits spring R to raise the foremost projection of detent arm Q into the opening of slide J to block its sidewise movement. With slide J blocked, the positive movement of intermediate slide I overcomes the tension of spring H, effecting the engagement of the other pocket of slide I with stud S and resulting in activating the opposite ribbon feed pawl.

LIFTING THE RIBBON INTO PRINTING POSITION

The black portion of the ribbon, which is normally below the printing line, is raised into printing position during each machine operation. The red (or contrasting color) portion of the ribbon may be indexed to shift into printing position from depression of the subtract bars, from a minus balance total or subtotal operation, or from carriage control.

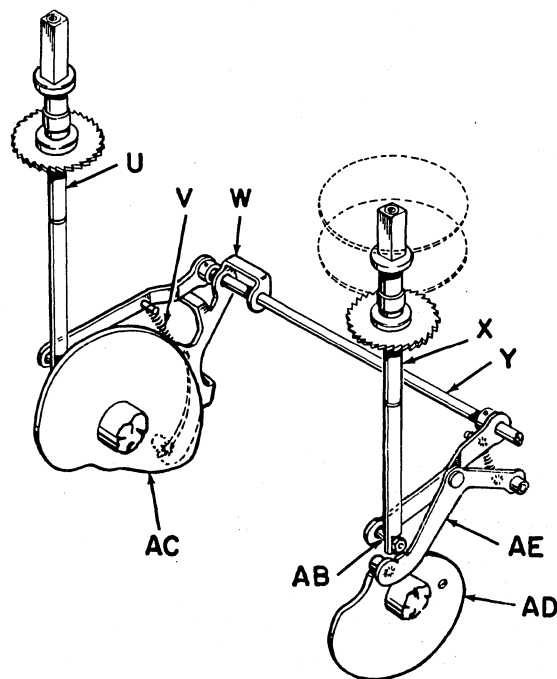


Fig. IV-11

The black portion of the ribbon is raised into printing position early in the machine cycle when cam AD on the main camshaft rocks lever AE upward to raise ribbon posts U and X through screws AB and shaft assembly Y.

During the latter portion of the machine cycle, the roll on cam AC contacts arm W to lower the ribbon posts through spring V and shaft assembly Y.

Shifting the Ribbon to Print In Red

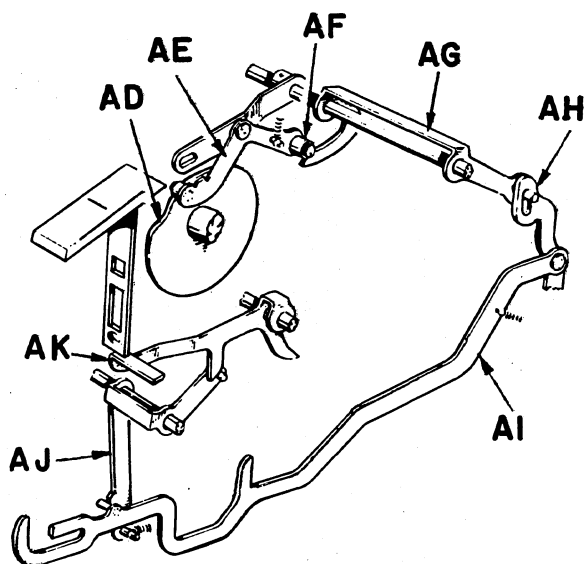


Fig. IV-12

Shifting of the red portion of the ribbon into printing position may be indexed from depression of the subtract bars or from the minus balance mechanism.

Depression of the subtract bars rocks lever AK and, through lever AJ, moves link AI forward. Forward movement of the link rocks bail AG to swing the hooked portion of the bail under roll AF. With bail AG in this position, rotation of cam AD raises lever AE which pivots on the hooked portion of the bail to provide more lift of the ribbon posts, thus raising the red portion of the ribbon into printing position when the main camshaft rocks lever AE.

During a minus total or subtotal operation, forward movement of minus balance control slide AN rocks bails AL or AM through pawls AO. The rocking of bails AL or AM moves link AI forward

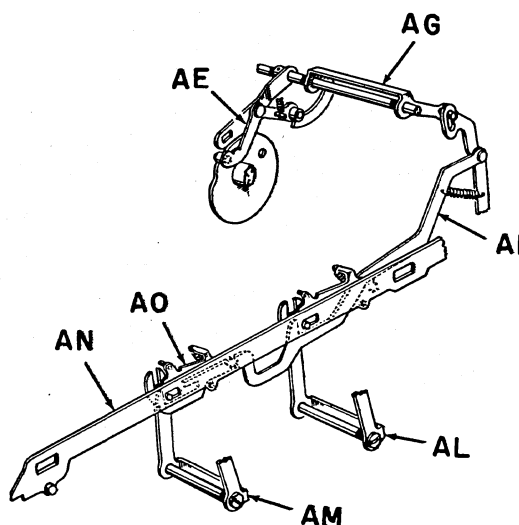


Fig. IV-13

to swing the hooked portion of bail AG under the roll on lever AE, thus indexing the red portion of the ribbon to be raised into printing position when the cam on the main camshaft rocks lever AE.

RIBBON SHIFT INDEXED AND REPEATED FROM CARRIAGE CONTROLS

When an accounting application requires items to be printed in red, the ribbon shift mechanism may be automatically indexed by a carriage control in lane 12. When alternate operations require items to be printed in red in more than one stop position, carriage controls in lane 19 will provide repeat of ribbon shift.

Ribbon Shift

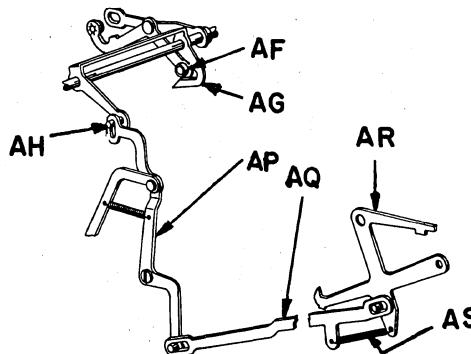


Fig. IV-14

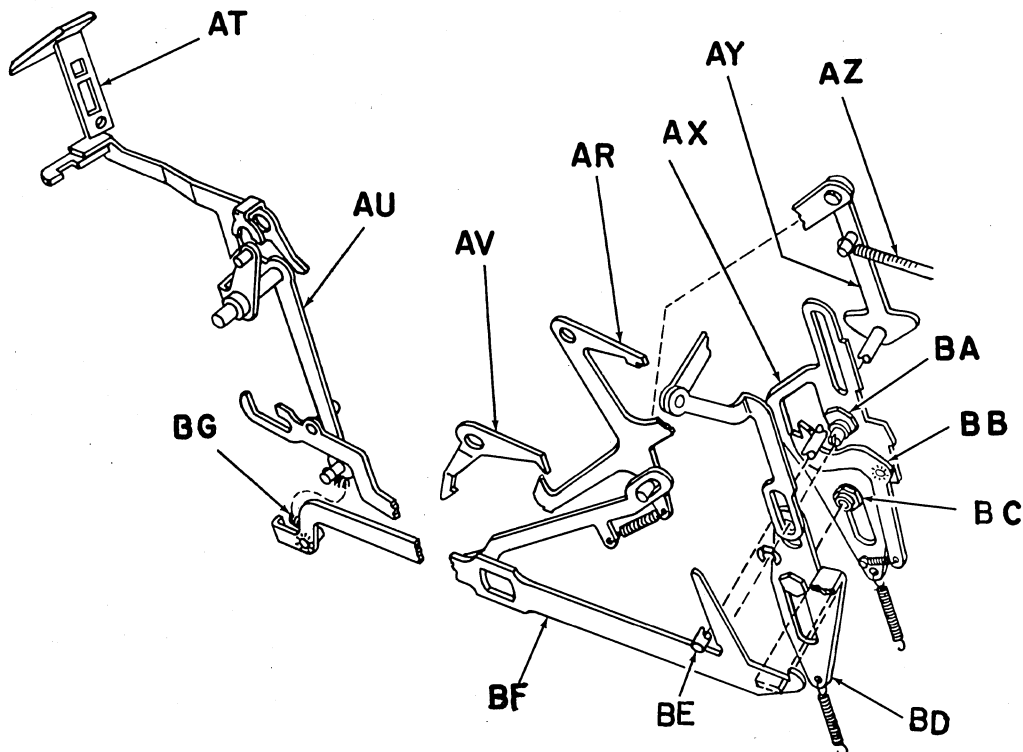


Fig. IV-15

A No. 5 control pin in lane 12, through the Carriage Control Sensing Unit, rocks bellcrank AR. Movement of bellcrank AR causes the hook of bail AG to be positioned under roll AF through spring AS, link AQ and lever AP so that the bottom portion of the ribbon will be raised to printing position during the machine cycle.

Ribbon Shift Repeat

Ribbon shift repeat is indexed from a No. 7 control pin in lane 19 when a subtract key on the keyboard has been depressed. After the ribbon shift repeat mechanism is indexed, No. 6 control pins in lane 19 are used to repeat the ribbon shift as many times as the alternate operation requires in subsequent stop positions. In the last stop position that requires ribbon shift repeat, a No. 5 control pin in lane 19 repeats the ribbon shift and causes the ribbon shift repeat mechanism to be normalized.

The ribbon shift repeat mechanism is indexed when a subtract key is depressed on the keyboard and a No. 7 control pin is active in lane 19.

When subtract key AT is depressed, ribbon shift is indexed in the usual manner, and through lever AU and spring BG, slide BF is moved forward to limit on the formed ear of slide BD. As the machine cycles, the No. 7 control pin in lane 19 lifts slide BD through the Carriage Control Sensing Unit and link. When the formed ear of slide BD is raised above the hook of slide BF, spring BG moves slide BF farther forward so that the vertical projection of slide BF drives stud BE over pass-by pawl BB into the pocket of slide AX. Near the middle of the machine cycle, lane 19 restores to normal and stud BE is retained in the pocket of slide AX by the pass-by pawl. Since slide AX is part of lane 19 mechanism and stud BE is part of lane 12 mechanism, lane 19 is in effect connected to lane 12.

In a subsequent stop position, a No. 6 control pin in lane 19 repeats the ribbon shift indexing. The No. 6 control pin causes the link to lift slide AX during the machine cycle. Since stud BE is retained in the pocket of slide AX, upward movement of the slide rocks lane 12 bellcrank AR through stud BE and link AY to index ribbon shift. A No. 6 control pin in lane 19 does not move bellcrank AR

far enough to latch behind latch plate AV; therefore, the high point of lane 19 sensing cam should hold the ribbon in shifted position until printing occurs.

A No. 5 control pin, in lane 19 of the last stop position in which the ribbon shift is to be repeated, indexes ribbon shift in the same manner as a No. 6 control pin. Since the No. 5 control pin is longer than a No. 6 control pin, lane 12 bellcrank will be rocked far enough to latch behind the latch plate. Thus, stud BE is retained in its raised position until after lane 19 linkage has restored to normal. As slide AX restores to normal, lowering the pass-by pawl away from stud BE, spring AZ moves stud BE and link AY rearward out of the pocket of slide AX. Therefore, when lane 12 bellcrank restores to normal near the end of the machine cycle, stud BE is out of the pocket of slide AX disconnecting lane 19 from lane 12.

The high point of lane 19 sensing cam on early machines was not long enough to hold the ribbon shift indexed from a No. 6 control pin until printing occurred; therefore, the ribbon shift could be repeated only once by using a No. 5 control pin in lane 19.

Tests and Adjustments

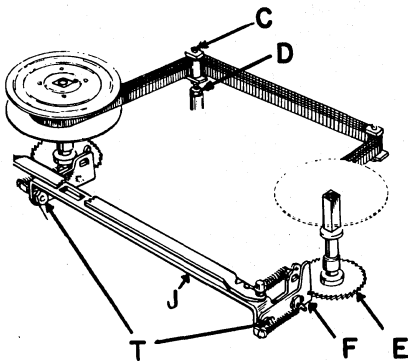


Fig. IV-16

PR14-1 With no keys indexed and the machine cycled to 150° , there should be $1/64''$ to $1/32''$ of ribbon visible above the tops of the type bars in the amount columns.

TO ADJUST, loosen lock nuts D and raise or lower the ribbon guide posts C.

NOTE: The long sides of the flanges of ribbon posts C should be parallel to the platen. On machines with floating ribbon posts to take up the ribbon slack, the post should be in its rearward position when the flange is aligned.
REASON: To ensure proper height of the ribbon and to prevent ribbon fraying and curling.

PR14-2 On machines with dual printing heads, the eccentric posts should be aligned parallel to the ribbon guide posts.

TO ADJUST, set the high side of the left eccentric post at 3 o'clock, and the high side of the right eccentric post at 9 o'clock.

REASON: To keep the ribbon parallel and clear of the type face and platen and to prevent smudging the journal sheets.

PR8-1 The active ribbon feed pawl F should seat in the teeth of ratchet gear E with a full hold at the beginning of the feed stroke.

TO ADJUST, loosen screw(s) T and reposition pawl(s) F.

REASON: To ensure positive feed of two teeth of gears E on each machine cycle.

PR8-2 (For machines with wide hammer section - twenty-two column construction.) With the ribbon feeding to the right hand spool and the machine cycled to approximately 170° to actuate slide J to its extreme left position, the left feed pawl should clear the teeth of the left ratchet by $.003''$ to $.005''$.

TO ADJUST, loosen the left screw T and position the left feed pawl.

REASON: To prevent premature reversal of the ribbon when it is feeding to the right ribbon spool.

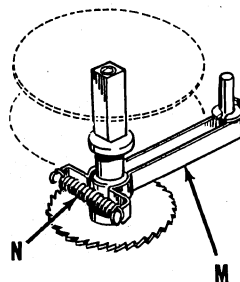


Fig. IV-17

PR8-3 The tension on the ribbon provided by brake M and spring N should be equal in either direction of ribbon feed, and sufficient to prevent ribbon sagging.

TO ADJUST, weave brake at spring anchor form for required tension.

REASON: To provide uniform ribbon feed and prompt reversal of ribbon travel.

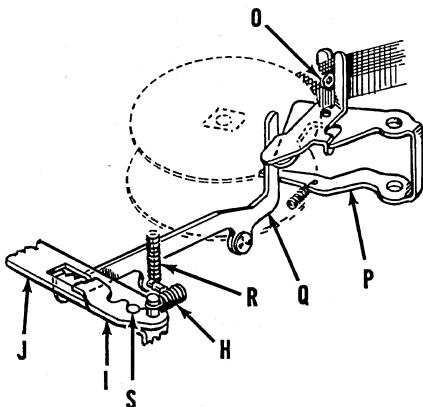


Fig. IV-18

PR8-4 NOTE: With the ribbon unwound from either spool, by machine operation and button O positioning bail P to the rear, spring R should raise Q into the cutout of slide J to block its lateral movement causing stud S to be moved to the other pocket of I.

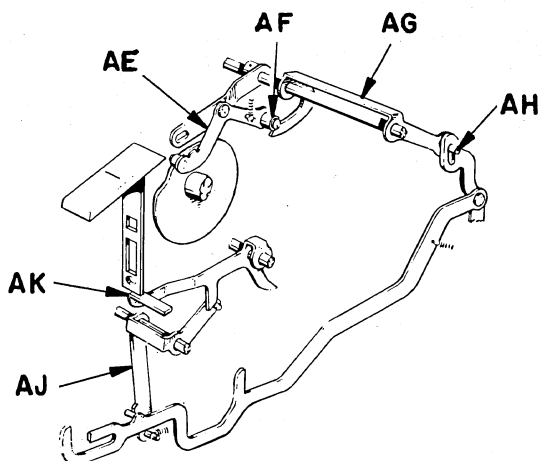


Fig. IV-19

PR3-1 With the machine normal and stud AH located against the rear end of the slot in the right sideframe, there should be no more than .005" passing clearance of roller AF and the end of the hooked projection of bail AG.

TO ADJUST, weave bail AG.

REASON: To ensure raising the black portion of the ribbon to correct printing position during the machine cycle.

PR3-2 With the machine normal and bail AG manually positioned under roller AF, there should be .005" to .025" clearance between roller AF and the hooked projection of bail AG.

TO ADJUST, bend hooked portion of AG as required. Recheck PR3-1.

REASON: To provide maximum lift of the ribbon assembly.

NOTE: When the red ribbon is raised to printing position, roller AF should still maintain a full contact on the horizontal surface of the hooked projection of bail AG.

PR3-3 With "A" subtract bar fully depressed, stud AH should be positioned at the front end of the slot in the right sideframe without binding.

TO ADJUST, weave bail AJ.

REASON: To ensure full indexing of the ribbon shift mechanism.

PR3-4 With "B" or "C" subtract bar individually fully depressed, stud AH should be positioned at the front end of the slot in the right sideframe without binding.

TO ADJUST, position the ear of bellcrank AK, REASON: To ensure full indexing of the ribbon shift mechanism.

PR3-5 NOTE: With the credit total slide in its forward detented position during a minus total operation of the crossfooter(s), stud AH should be positioned at the front end of the slots in the right sideframe without binding.

PR3-7 NOTE: With the lane 12 bellcrank latched on its latch plate, stud AH should be positioned to the front end of the slot in the right sideframe without binding.

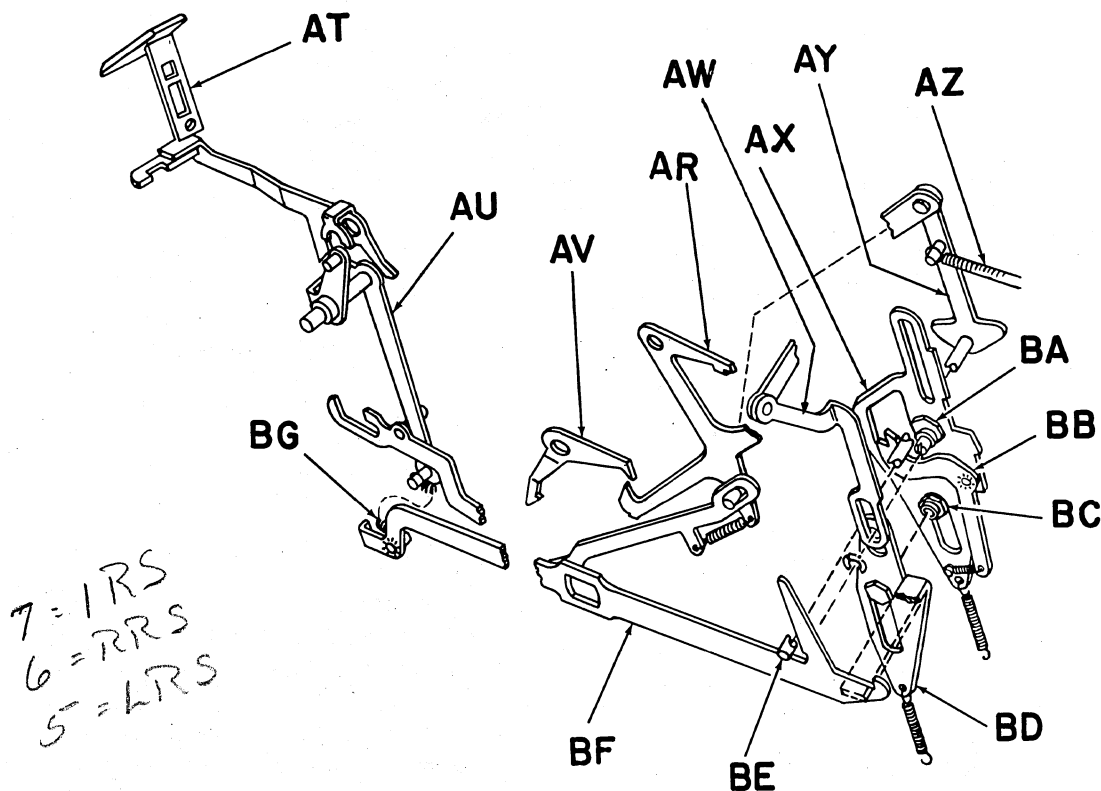


Fig. IV-20

PR4-1 With link AW disconnected from eccentric collar BA, stud BE should engage in pocket of slide AX with not more than .003" clearance between the underside of the stud BE and the pocket of slide AX.

TO ADJUST, turn eccentric BC.

REASON: To establish the normal position of slide AX.

PR4-2 With stud BE in pocket of slide AX and a No. 5 control pin active in lane 19, manually cycle the machine to approximately 50°. There should be no less than .005" latching lead of bellcrank AR beyond latch plate AV.

TO ADJUST, turn eccentric BA.

REASON: To ensure latching of bellcrank AR and release of the ribbon shift repeat mechanism.

PR4-3 With the machine normal, lane 19 sensing lever should be seated in its home position.

TO ADJUST, recheck eccentric BA.

REASON: To ensure normal clearance between the control pins and tappets during carriage movement.

PR4-4 With stud BE in the pocket of slide AX and a No. 6 control pin active in lane 19, manually cycle the machine to approximately 50°. Stud AH should be positioned to the front end of the

slot in the right sideframe without binding and bellcrank AR should not latch on latch plate AV. TO ADJUST, recheck eccentric BA (test PR4-2). NOTE: When the red ribbon is raised to printing position, roller AF should still maintain a full contact on the horizontal surface of the hooked projection of bail AG.

REASON: To ensure full indexing of the ribbon shift mechanism and maintain an index of ribbon shift repeat.

PR4-5 With a No. 7 control pin active in lane 19 and a subtract bar depressed, the rear projection of the slide BF should have .010" to .015" clearance under the ear of slide BD at approximately 50° of the machine cycle.

TO ADJUST, raise or lower the rearward portion of slide BF as required.

REASON: To ensure indexing of the ribbon shift repeat mechanism.

PR4-6 With the machine normal and a subtract bar depressed, the ear of slide BD must block the forward travel of slide BF.

TO ADJUST, recheck PR4-5.

REASON: To prevent index of ribbon shift repeat mechanism.

PRINTING SYMBOLS AND A CLEAR SIGNAL

Symbols are printed during subtract, non-add, and add operations in which amounts are indexed on the keyboard and also during total and subtotal operations. A clear signal of two ciphers is printed in the units and tens of cents columns during total and subtotal operations of a clear machine.

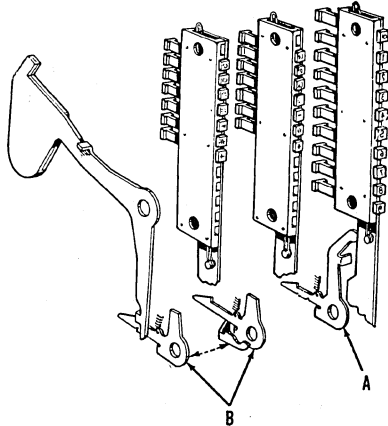


Fig. IV-21

During subtract, non-add or add operations in which amounts are indexed on the keyboard, latches B are rocked clear of the lower ears of the hammers in the symbol columns by latches A in the amount columns, through the overlapping tails of the latches, thereby permitting the symbols indexed by the accumulator controls to print.

When no amounts are indexed on the keyboard, latches B remain normal, thus preventing the symbols from printing.

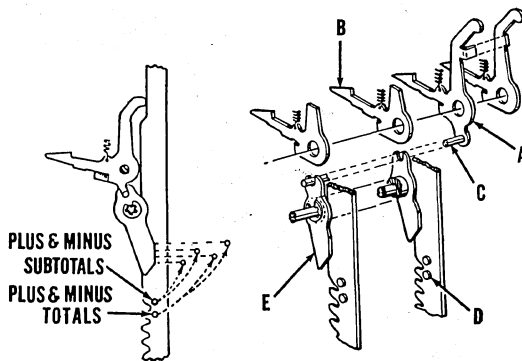


Fig. IV-22

During plus or minus total or subtotal operations of a clear machine, studs D on the symbol type bars locate on the rear flat surfaces of pawls E, rocking latch A in the units of cents column through stud C. The formed ear on latch A in the units of cents column rocks the latch in the tens of cents column and, through the overlapping tails, rocks latches B in the symbol columns clear of their respective hammers, thus permitting the printing of the two cipher clear signal and the total or subtotal symbols.

A single cipher clear signal is obtained by omitting the formed ear from the latch in the units of cents column; and a three cipher clear signal is obtained through a longer formed ear on the latch in the units of cents column which rocks the latches in the tens of cents and the dollar column.

NINE POSITION PRINTING CONTROL AND CARRIAGE CONTROLLED CIPHER SPLITS

Various printing combinations are provided to accommodate the printing requirements of an accumulating application. The printing control shaft, indexed by different length control pins in lane 22 of single printers and lanes 22 and 23 of dual printers, can permit all columns to print or prevent any column or combination of columns from printing. In addition to printing controls, lanes 22 and 23 also provide carriage controlled cipher splits to prevent ciphers from printing to the right of indexed amounts.

Printing Controls

The printing control shaft, mounted on the front of the Printing Unit, is indexed by carriage controls and actuated through the main camshaft. When the carriage controls are inactive or when a control pin is not provided, the printing control shaft will remain in its normal home position.

Control pins 1 through 8 are used to index eight additional positions of the printing control shaft, thereby providing nine different printing combinations. Disks on the printing control shaft control latches to prevent any combination of hammers from firing even though amounts or characters are indexed.

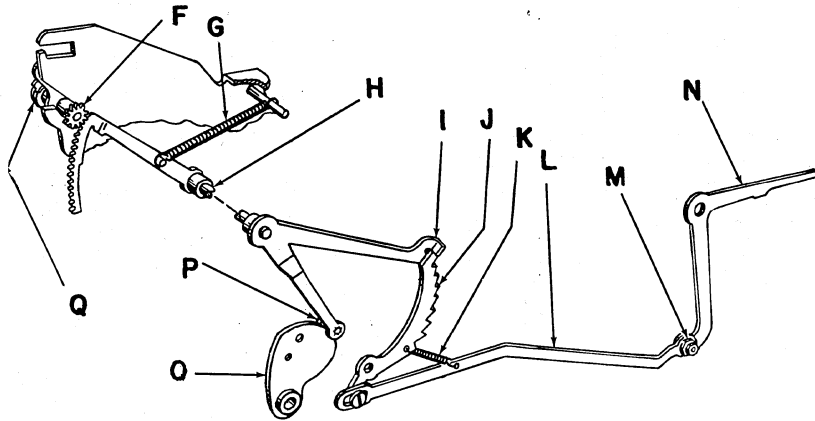


Fig. IV-23

Bellcrank N, which is rocked rearward from a control pin in lane 22, pulls link L and spring K rearward to position a step of index rack J under formed ear I. The indexed step of index rack J corresponds to the number of the control pin used in lane 22. After the index rack has been positioned, rotation of the main camshaft causes cam O to move away from roll P permitting spring G to rock shaft assembly H; thus rotating printing control shaft F to position disks Q.

With a control pin in lane 23, rotation of cam AF causes the right end of AG to be moved upward indexing AO through link AH, shaft AI and link AN, rotation of cam AM on the main camshaft allows AP to be lowered by spring tension to rotate printing camshaft AK.

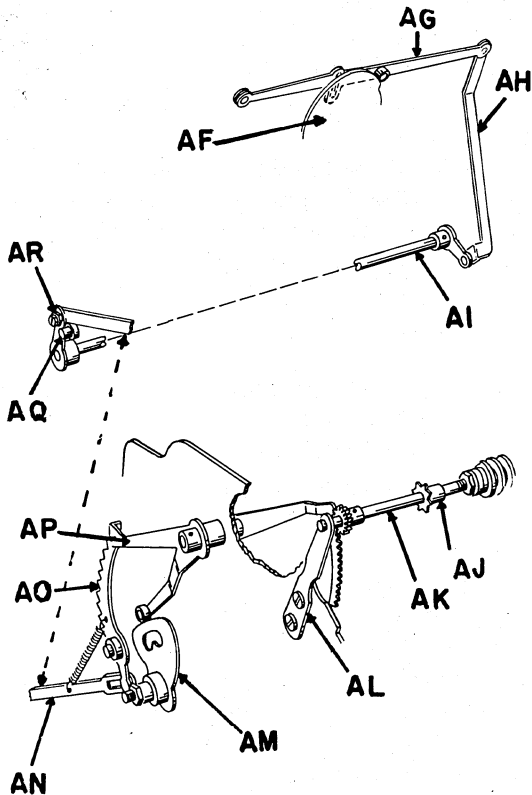


Fig. IV-24

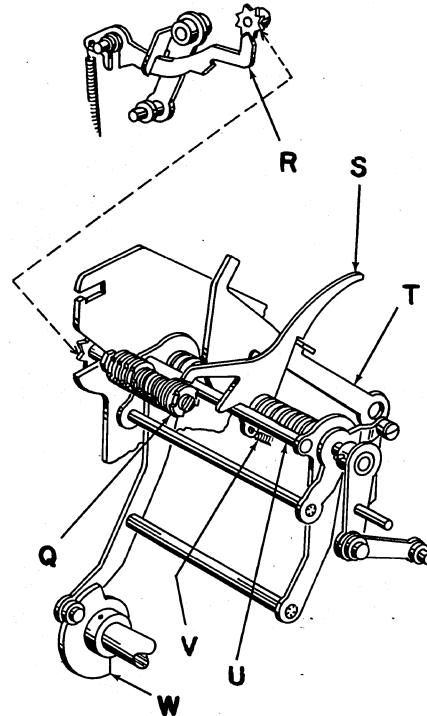


Fig. IV-25

Cam W on the main camshaft causes shaft assembly U to hold hammer block latch S out of engagement with the printing control shaft until after the printing control shaft has been rotated to its indexed position. When the high point of cam W moves away from shaft assembly U, spring V

rocks the hammer block latch to contact printing control disc Q on the printing control shaft. The printing control disk, in each column, contains cutouts or projections that are positioned under the forward ends of the hammer block latches when the printing control shaft is rotated to its different positions. A cutout in a printing control disk permits spring V to rock the step of the hammer block latch clear of the formed ear of printing hammer T to permit the printing hammer to fire. When a projection on the printing control disk is positioned under the hammer block latch the latch is prevented from rocking; therefore the step of the latch will block the printing hammer to prevent the hammer from firing.

Detent R, on the left side of the Printing Unit, is engaged with the star wheel on the printing control shaft at all times to stabilize and control the rotation of the printing control shaft.

Carriage Controlled Cipher Splits

Carriage controlled cipher splits are indexed in conjunction with the printing controls from lane 22 and 23 to prevent ciphers from printing to the right of indexed amounts. The cipher splits are controlled from disks, similar in appearance to the printing control disks, located on the printing control shaft between the printing control disks.

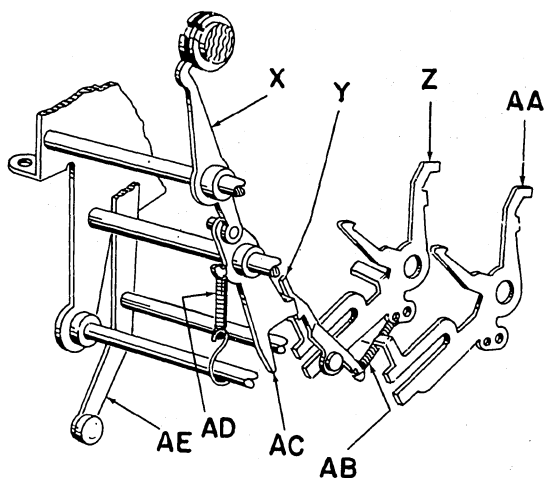


Fig. IV-26

When the machine is at normal, shaft assembly AE holds lever AC forward to hold lever X disengaged from the printing control shaft until after the printing control shaft has been rotated to its selected position. Also, the formed ear of lever AC is held away from coupler latch Y permitting hammer latch Z at the left of the split position to be coupled to hammer latch AA at the right of the split position.

After the printing control shaft has been rotated to its indexed position, shaft assembly AE moves rearward, permitting spring AD to rock lever X through lever AC. If a cutout on the cipher split disk is in line with lever X, the formed ear of lever AC will be moved upward, lifting coupler latch Y, to prevent the hammer latch at the left of the split position from actuating the hammer latch at the right of the split position; thereby providing a split between two printing columns. When a projection on the cipher split disk is in line with lever X, lever AC is prevented from moving. This permits spring AB to retain coupler latch Y engaged with the formed ear of the hammer latch at the right of the split position so that a split will not occur between two printing columns.

Tests and Adjustments

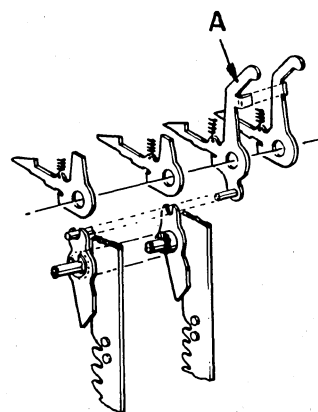


Fig. IV-27

PR7-6 There should be .001" clearance between the upper ear of latch(s) A and adjacent latch. TO ADJUST, bend ear(s) of latch(s) A. REASON: To ensure release of hammers in the closed account feature.

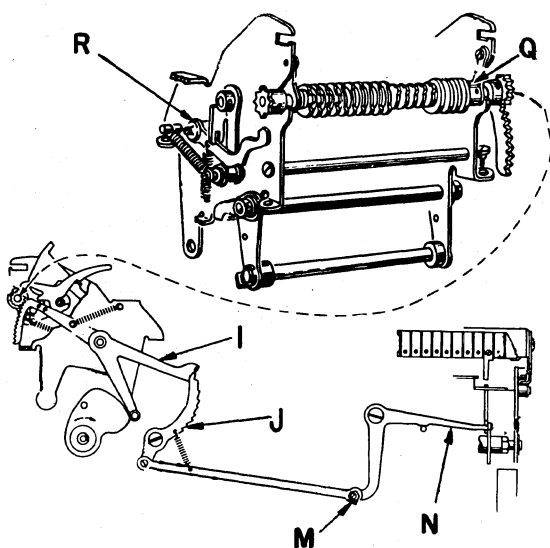


Fig. IV-28

PR2-1 With the carriage control inactive and the machine cycled to 70° , detent R should seat fully in the star wheel.

TO ADJUST, bend upper arm of I as required.

REASON: To establish the correct operating position of the arms of assembly I.

PR2-2 With the machine normal there should be .010" to .020" clearance between the top edges of index rack J and the upper arm of assembly I. TO ADJUST, bend the roller arm of assembly I as required.

REASON: To eliminate interference between index rack J and assembly I.

PR2-3 With machine normal, bellcrank N should enter the forked portion of the sensing lever with equal clearance.

TO ADJUST, bend extreme rearward end of bellcrank N.

REASON: To assure the correct normal position of the sensing lever.

PR2-4 With a No. 1 pin active in lane 22 and the machine cycled to 120° , manually raise the lower assembly I. Printing control camshaft Q should be free to rotate and have no more than .002" forward and rearward movement. TO ADJUST, move the camshaft hangers as required.

REASON: To ensure correct selection of printing control camshaft as selected from carriage control.

PR2-5 With a No. 2 control pin active in lane 22 the formed ear of assembly I should seat on the selected step of index rack J with .015" to .020" clearance beyond preceding step.

TO ADJUST, turn eccentric M as required.

REASON: To ensure safe hold of assembly I in selected positions.

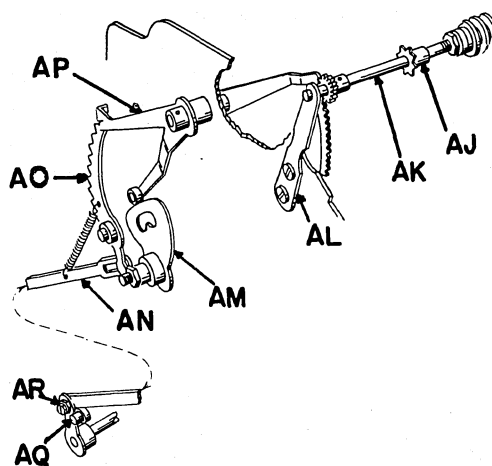


Fig. IV-29

PR2-1-1 With the machine in normal position and with forward pressure applied to arm AN, upward movement of the tappet in lane 23 should not be noticeable.

TO ADJUST, turn eccentric AQ as required.

CAUTION: The above adjustment must not prevent the tappet seeking its normal limit.

REASON: To prevent tappet rebounding.

PR2-1-2 With the carriage inactive and machine cycled to 70° , the detent should seat fully in star wheel AJ.

TO ADJUST, bend upper arm of AP as required.

REASON: To establish a normal position for AP.

PR2-1-3 With the machine normal, there should be .010" to .020" clearance between the top of AO and the upper arm of AP.

TO ADJUST, bend the lower arm of AP as required.

REASON: To eliminate interference between AQ and AP.

PR2-1-6 With a No. 1 control pin active in lane 23 and the machine cycled to 120° , manually raise and lower assembly AP, shaft assembly AK should be free to rotate and have no more than .010" movement forward or rearward.

TO ADJUST, move hanger on left sideframe of printing section out of position. Adjust right camshaft hanger and bracket AL. Reposition hanger on left sideframe of printing section.
 REASONS: To ensure correct selection of printing control camshaft as selected from carriage control.

PR2-1-8 With a No. 2 pin active in lane 23 the formed ear of AP should seat on selected step of rack AO with .015" to .020" clearance with preceding step.

TO ADJUST, turn eccentric AR as required.

REASON: To ensure safe hold of AP on the step of AO in the selected position.

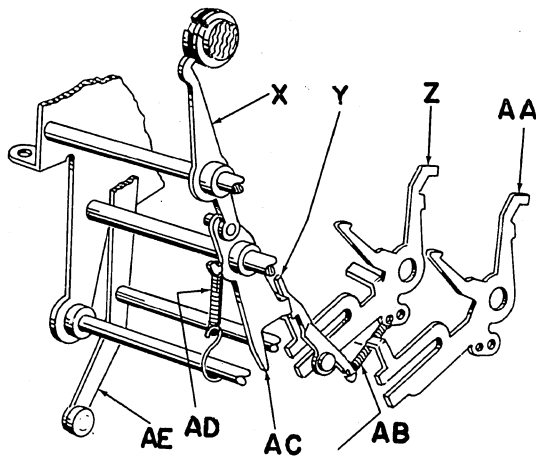


Fig. IV-30

PR7-8 Coupler arm Y should latch over the ear of adjacent hammer latch AA.

TO ADJUST, spread or close the "U" form of adjacent hammer latch AA.

REASON: To ensure printing of ciphers to the right of an indexed amount when a carriage controlled cipher split is not active.

PR7-9 NOTE: With all carriage controlled cipher splits inactive and an amount indexed in the column to the right of the permanent split, manually cycle the machine. All latches to the right of the permanent split should have sufficient forward movement to release their hammers.

REASON: To ensure printing of all ciphers and symbols to the right of the indexed amount in the last column with the carriage controlled cipher splits and hammer blocks inactive.

PR7-13 The formed ears of release arms AC should align with latches Y.

TO ADJUST, loosen the set collars and shift the release arm assembly. Remove any excess play in the release arm assembly when retightening the set collars.

REASON: To ensure unlatching of latches Y in a carriage controlled cipher position.

PR7-14 Index fingers X should align with their respective disks on the print control shaft.

TO ADJUST, loosen the set collars and shift the index finger assembly as required. Remove any excess play in the index finger assembly when retightening the set collar.

REASON: To ensure indexing of a carriage controlled cipher split.

PR7-15 NOTE: Release arms AC should have a full hold on the studs in index fingers X and both parts must be free.

REASON: To ensure full movement of release arms AC and index fingers X.

Burroughs
SERIES F25-F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F700 and F5000)

INSTRUCTION BOOK

Section V



MECHANISMS AND ADJUSTMENTS
ACCUMULATION

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ACCUMULATION

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ACCUMULATION MECHANISMS

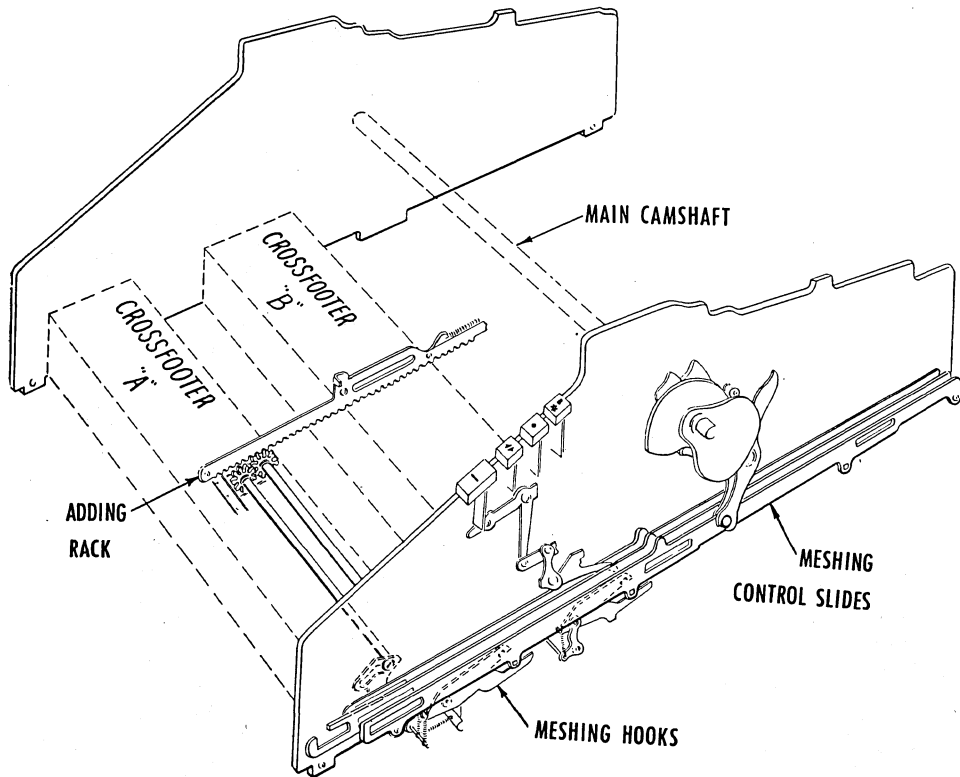


Fig. V-1

Series F100 machines contain two crossfooters, one each in accumulating sections "A" and "B". The crossfooters are controlled independently to provide a means of accumulating either plus or minus amounts and maintaining a printable balance of those amounts. The crossfooters are of identical construction and are designed to produce direct minus totals.

The accumulator pinions, which are normally in mesh with the carry racks, are raised into mesh with the adding racks by the main camshaft which moves the meshing control slides rearward to raise the pinion assemblies through the accumulator meshing hooks.

Unless otherwise indexed, an add operation is indexed in both accumulators. This normal add function may be changed from carriage control or from depression of the accumulator control keys which lower the proper meshing hooks into engagement with the meshing control slides, thus permitting the accumulator pinions to be

meshed with the adding racks at the proper time during the machine cycle to provide the indexed accumulator function.

Each crossfooter consists of two sets of intermeshed pinions. A cross-sliding action of the pinion assemblies permits only one set of pinions to mesh with the adding racks at a given time. This cross-sliding action locates the forward set of pinions in active position (in line with the adding racks) during add, subtract and plus total and subtotal operations. The rear set of pinions is shifted into active position during minus total and subtotal operations.

The accumulator pinions are turned in either direction by the adding racks - addition being accomplished by turning the pinions when the adding racks move rearward and subtraction by turning the pinions when the adding racks move forward. Totals and subtotals transfer from one accumulator to the other automatically, unless otherwise controlled.

A detent shaft is rocked into tooth spaces of the rear set of pinions during their engagement with and disengagement from the adding racks to maintain the correct position of the pinions during meshing and unmeshing.

The accumulator pinions have long teeth (one per pinion) which are used to index carries and, by limiting on the total limit bail, provide a limit for the adding racks during total and subtotal operations.

Symbols, which identify the various mathematical functions of the machine, are indexed through the accumulator control linkages. A separate set of symbols is indexed for each accumulator.

Meshing the Accumulator Pinions With the Adding Racks

The following explanation of the operation of meshing controls deals with the time and manner in which the accumulator pinions are engaged with and disengaged from the adding racks during add, subtract, total and subtotal operations. Indexing of the various accumulator functions is covered under separate headings.

The meshing control slides are given a reciprocating movement by the cams and rollers on the main camshaft through the levers which are actuated by the cams and rollers. The meshing con-

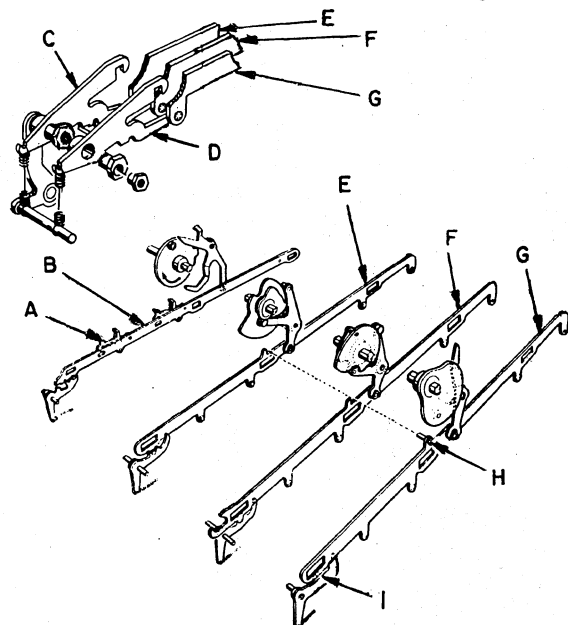


Fig. V-2

trol slides are held in normal position by detents under spring tension.

Meshing control slide F and the lower arms of meshing hooks C are used to mesh the accumulators during an add operation, control slide E and the upper arms of meshing hooks C mesh the accumulators during subtract and total operations, and control slide G and meshing hooks D mesh the accumulators during subtotal operations.

Minus balance control slide B, which is moved forward at the approximate 27 degree point in the machine cycle, cross-slides the rear set of accumulator pinions into active position, through pawls A, prior to meshing the pinions with the adding racks. The minus balance control slide is moved rearward at the approximate 340 degree point.

The lower arms of meshing hooks C are normally engaged with square studs on the add meshing control slide - causing crossfooters "A" and "B" to add simultaneously during a normal machine operation.

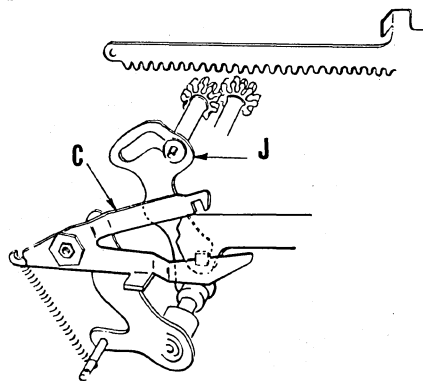


Fig. V-3

During an add operation, the crossfooter pinions are meshed at the approximate 147 degree point in the machine cycle, when the rearward movement of the add meshing control slide, through the lower arm of meshing hook C, rocks cam assembly J to raise the crossfooter pinions into engagement with the adding racks. As the machine operation continues, the add meshing control slide starts forward at the approximate 268 degree point, thus the forward movement of the add meshing control slide, through the meshing hook, rocks cam assembly J to disengage the pinions from the adding racks.

During a subtract operation, the crossfooter pinions are meshed at the approximate 37 degree

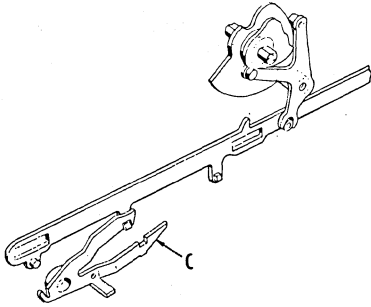


Fig. V-4

point in the machine cycle, when the rearward movement of the subtract/total meshing control slide, through the upper arm of meshing hook C, rocks the crossfooter pinions upward into mesh with the adding racks. At the approximate 207 degree point, the forward movement of the subtract/total meshing control slide disengages the pinions from the adding racks.

During a total operation, the crossfooters are engaged and disengaged at the same time and in the same manner as during a subtract operation.

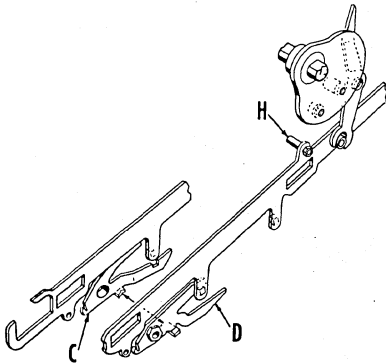


Fig. V-5

During a subtotal operation, the crossfooter pinions are meshed at the approximate 37 degree point, when the rearward movement of the subtract/total control slide moves the subtotal control slide rearward, through eccentric H, thereby rocking the crossfooter pinions into mesh with the adding racks through meshing hook D. When the operation reaches the approximate 317 degree point, forward movement of the subtotal meshing control slide disengages the crossfooter pinions from the adding racks.

Lowering of the subtotal meshing hook into engagement with the square stud of the subtotal meshing control slide disengages the lower arm of

meshing hook C from the add meshing control slide through the formed ear on the lower portion of the meshing hook.

Tests and Adjustments

A9-1 With the machine normal stud H in slide G must be in contact with one or both slides E and F. If both slides E and F are not in contact with stud H, the slide that is not in contact should have no more than .004" clearance between the slide and stud.

TO ADJUST, turn eccentric I as required.

REASON: To ensure an undelayed movement of slide G when activated by slide E or F.

A9-2 With the machine at normal and meshing hooks C positioned on the square studs of slides E or F, there should be .005" to .008" clearance between the square studs and the rear ends of the cutouts in hooks C.

TO ADJUST, turn eccentric in hook C.

REASON: To establish uniform position of meshing hooks C in relation to square stud in slides E and F.

A9-3 With the machine at normal and meshing hooks D positioned over the square studs of slide G, there should be .005" to .008" clearance between the square studs and the rear ends of the cutouts in the meshing hooks D.

TO ADJUST, turn eccentric in hook D.

REASON: To establish uniform position of meshing hooks in relation to the square studs in slide G.

A9-4 With machine normal and slides E, F and G properly detented, the eccentric H in slide G must be in contact with one or both of the control slides E or F. If both are not contacted, the slide that is not in contact with eccentric H should have no more than .004" clearance between the eccentric and the slide.

TO ADJUST, turn eccentric H as required.

REASON: To ensure immediate movement of slide G when actuated by either slide E or F.

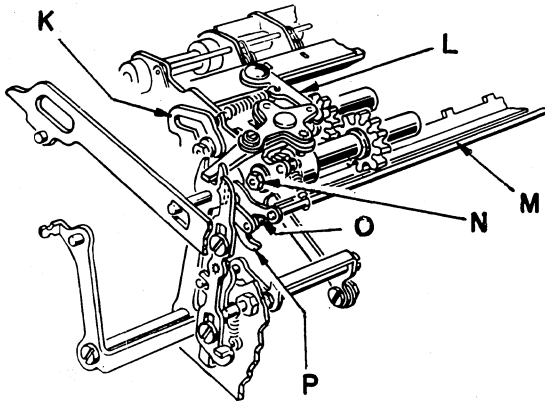


Fig. V-6

A4-8 Camming arms K, when moved rearward, should clear retaining nuts N on the right and left sides.

TO ADJUST, weave the camming arms away from the nuts.

REASON: To prevent interference when meshing the pinions with the add racks.

A4-9 With the complete pinion assembly in a normal position, the sideframes of the pinion assembly should clear studs O by .005" to .010".

TO ADJUST, weave the sideframe of the pinion assembly.

REASON: To prevent a false limit when restoring the pinions to a lowered position.

A4-10 With the pinion assembly in a raised position, cams P on the right and left sides should have 3/4 to a full hold on studs O.

TO ADJUST, bend the cam as required being careful to avoid creating a bind.

REASON: To ensure disengaging the aligner bail from the rear pinions when the pinions are meshed with the adding racks.

CARRY MECHANISM

The Carry Mechanism provides a means of accumulating amounts in excess of the capacity of the pinion or pinions into which the amounts are introduced by carrying one to the pinion to the left of the column in which the capacity is exceeded.

Carries resulting from addition or subtraction are produced in two stages: the initial carry, which takes place while the pinions are in mesh with the adding racks, and the completed carry, which is produced when the pinions are disengaged from the adding racks and meshed with the carry racks.

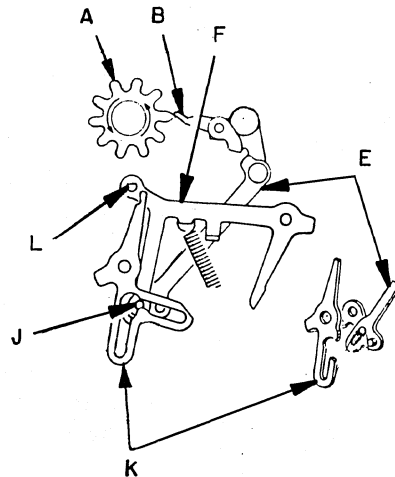


Fig. V-7

An initial add carry is produced when the long tooth of pinion A rocks carry pawl B upward. Upward movement of the carry pawl lowers link E and rocks bail K to locate the horizontal portion of its internal cam in line with stud J, and its upper finger forward of the center of stud L.

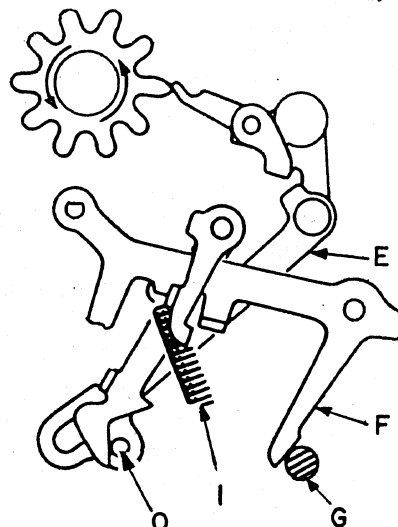


Fig. V-8

Continued lowering of link E rocks latch bail P rearward through stud O to release driver arm F, thereby permitting spring I to swing the driver arm to its initial carry position against shaft G. With driver arm F in initial carry position stud J detents bail K to assure an odd carry.

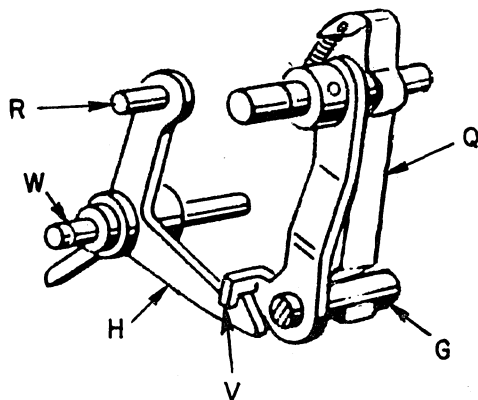


Fig. V-9

The driver arm is retained in its initial carry position by reset shaft G which limits on latches H. Spring anchor Q holds the reset shaft against the latches to prevent a bounce of the shaft and possible interference with initial carries.

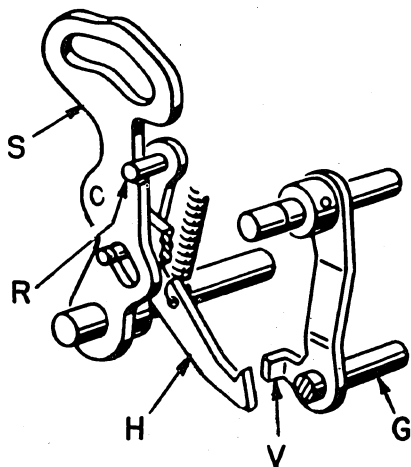


Fig. V-10

Completion of an add carry results when the forward rocking of cam assembly S lowers latches H through stud R, thereby releasing reset shaft G.

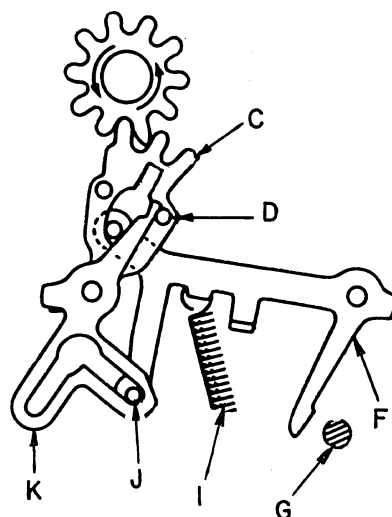


Fig. V-11

When the reset shaft is released, driver arm F, through spring I and stud J, rocks bail K by camming against the lower surface of its horizontal slot. As bail K is rocked, its upper finger contacts stud D and drives carry rack C forward to turn the pinion in the next column one tooth in an add direction.

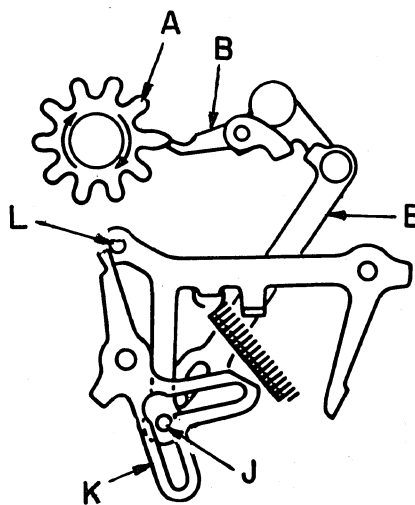


Fig. V-12

A subtract carry is produced when the long tooth of pinion A rocks carry pawl B downward. Downward movement of the carry pawl raises link E and rocks bail K to locate the vertical portion of its internal cam in line with stud J, and its upper finger rearward of the center of stud L.

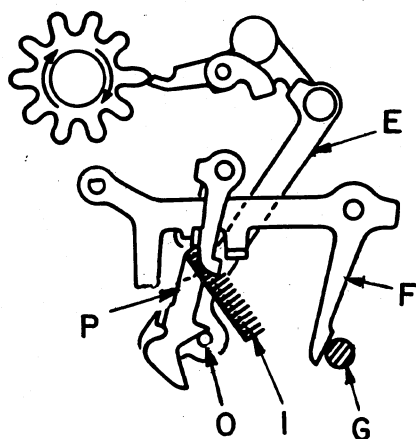


Fig. V-13

Continued raising of link E rocks latch bail P rearward through stud O to release driver arm F, thereby permitting spring I to swing the driver arm to its initial carry position against reset shaft G. With driver arm in the initial carry position stud J detents bail K to assure a subtract carry.

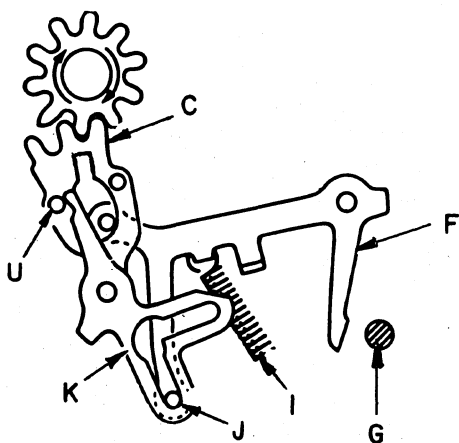


Fig. V-14

When the reset shaft is released, driver arm F, through spring I and stud J, rocks bail K by camming against the forward vertical surface of the internal cam. As bail K is rocked, its upper finger contacts stud U and drives carry rack C rearward to turn the pinion in the next column one tooth in a subtract direction.

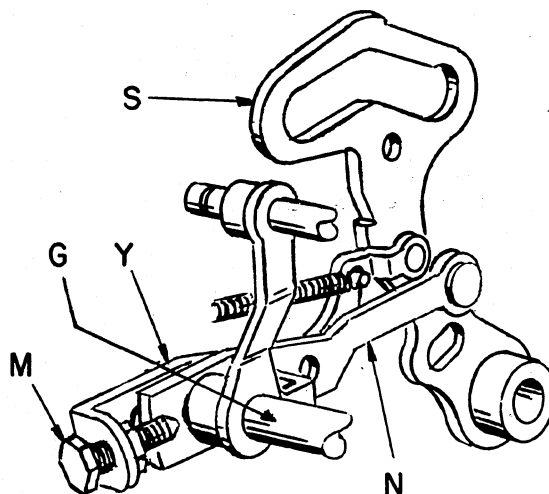


Fig. V-15

Resetting of either add or subtract carries results when links N and Y are moved rearward by assembly S. Link N contacts shaft G at the start of the reset operation and link Y, which has a higher pivot point on arm assembly S and moves further, provides the necessary movement through screws M to assure resetting driver arms F on latches P.

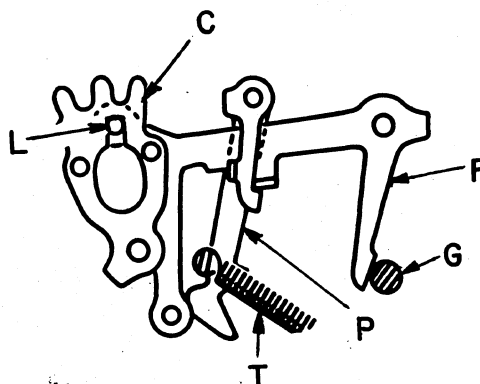


Fig. V-16

As the carry reset shaft moves rearward, driver arm F is restored to normal, carry rack C is reset through stud L, and spring T positions latch P under the formed ear of the driver arm to retain the driver arm in its normal position.

Automatic One Mechanism

The Automatic One Mechanism transfers one to the first accumulating pinion when the capacity of the accumulator is exceeded by added or subtracted amounts that change the nature of the accumulated total from plus to minus or minus to plus.

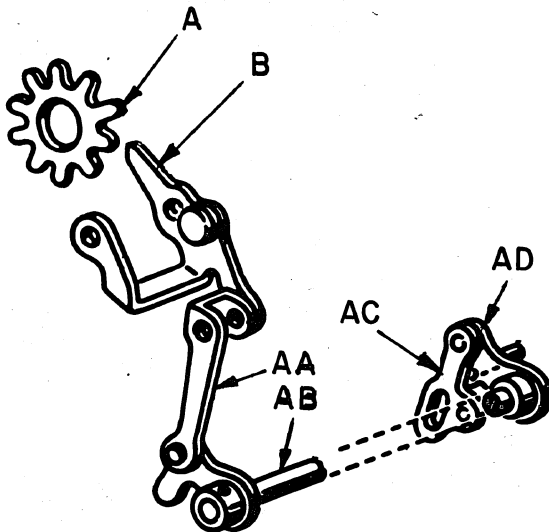


Fig. V-17

An automatic one is produced in a similar manner to that of a conventional carry. The long tooth of the last pinion A rocks carry pawl B upward (add) or downward (subtract) to lower or raise link AA, thus turning shaft assembly AB either rearward or forward to position the carry index bail and release the carry driver arm latch in the first column.

During a subtract operation in which the amount subtracted exceeds add amounts previously accumulated, capacity of the accumulator is exceeded by the relay carry and the long tooth of the pinion rocks carry pawl B downward to raise link AA. Link AA turns shaft AB forward to raise link AC.

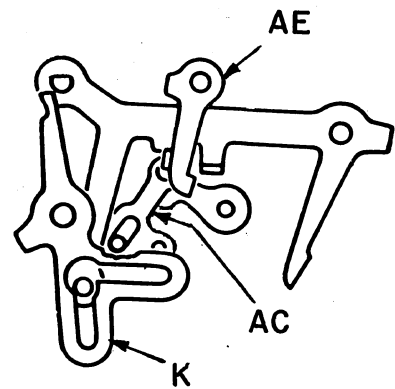


Fig. V-18

Upward movement of link AC positions index bail K in subtract position and releases latch AE.

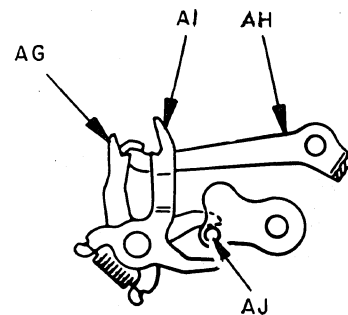


Fig. V-19

Prior to release of latch AE, stud AJ swings interlock AG rearward to clear the angle shelf of driver arm AH, thereby permitting the driver arm to move the carry rack rearward to turn the first accumulating pinion one tooth in the subtract direction.

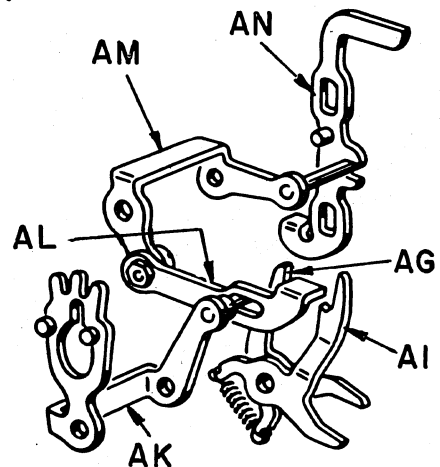


Fig. V-20

As carry rack AK moves rearward, slide AN is lowered to minus position, through link AL and bail AM, thus indexing the Minus Balance Mechanism. Rearward movement of link AL also moves interlock AG rearward and allows interlock AI to locate in the path of the angle shelf of the driver arm.

During an add operation in which the amount added exceeds the accumulated minus amount, the relay carry rocks the carry pawl in the last column upward, thus turning shaft assembly AB to locate the carry index bail in add position and release the driver arm latch in the first column.

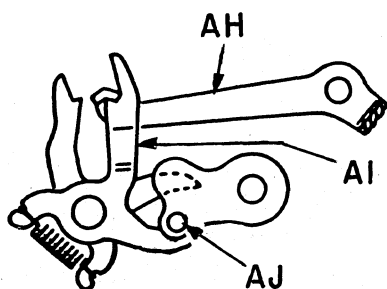


Fig. V-21

Interlock AI is rocked forward through stud AJ to clear the angle shelf of driver arm AH, thereby permitting the driver arm to move the carry rack forward to turn the first accumulating pinion one tooth in the add direction.

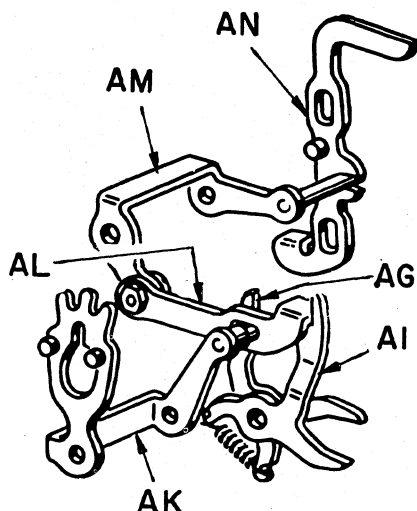


Fig. V-22

As carry rack AK moves forward, slide AN is raised to plus position through link AL and bail AM. Forward movement of link AL also moves interlock AI forward and allows interlock AG to locate in the path of the angle shelf of the driver arm.

Interlocks AG and AI are alternately active, being determined by the nature of the accumulated total - AG plus and AI minus. They disable the driver arm when capacity of the accumulator is exceeded by added or subtracted amounts that do not change the nature of the accumulated total.

Tests and Adjustments

A4-1 When the crossfooter is placed on a flat, even surface with all screws and nuts of the sideframes tightened, the projections on the bottom of the right and left sideframes should all contact the flat surface.

TO ADJUST, loosen the two nuts and one screw holding the left sideframe of the crossfooter, straighten the crossfooter and retighten the nuts and screw.

REASON: To ensure free action and alignment of parts.

A4-2 When the long teeth of the rear pinions are upward, the long teeth of the front pinions should be located in the deep pockets of the rear pinions.

TO ADJUST, remove the rear pinion shaft and reposition the pinions as required.

REASON: To correlate front and rear pinions with carry pawls and plus and minus total limit bails.

A4-3 The front and rear pinion assemblies should cross-slide freely in lowered position and have no interference with brackets Y with rear pinions shifted to the left. The long teeth of the pinions in the third and eighth columns should clear bracket Y.

TO ADJUST, reposition brackets Y and Z as necessary.

REASON: To ensure shifting the pinions for plus and minus totals and full rotation of the pinions.

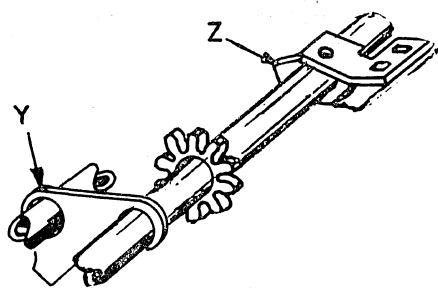


Fig. V-23

A4-3 When either the front or rear pinions are in their fully shifted position, the nut on the right end of the pinion shaft which contacts the right sideframe of the crossfooter should provide no less than .010" meshing hold between the front and rear pinions.

To Adjust Turn the right hand nut flush with the end of the tube on which the pinions rotate.

Reason To prevent front and rear pinion assemblies from becoming disengaged laterally.

Note : With this adjustment made, the long teeth of the rear pinions should have at least $\frac{1}{2}$ side hold on the projections of the minus total limit bail when the rear pinions are in minus total position.

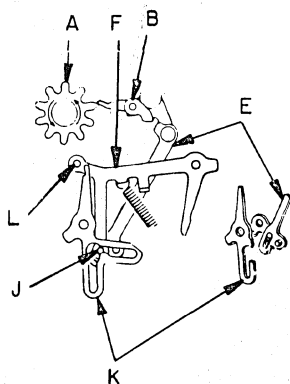


Fig. V-24

A3-21 Link E should be free and float on stud in the directional bail K.

To Adjust Bend link E.

Reason To prevent interference with component parts and ensure free action of the link.

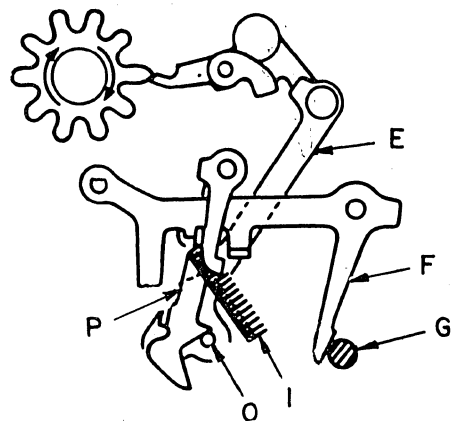


Fig. V-25

A3-22 Latches P should be free and have no more than .010" side clearance with studs in directional bails K.

To Adjust Bend arm of latch P as required for clearance with stud.

Reason To maintain alignment of component parts and ensure that link E does not drop off stud in bail K.

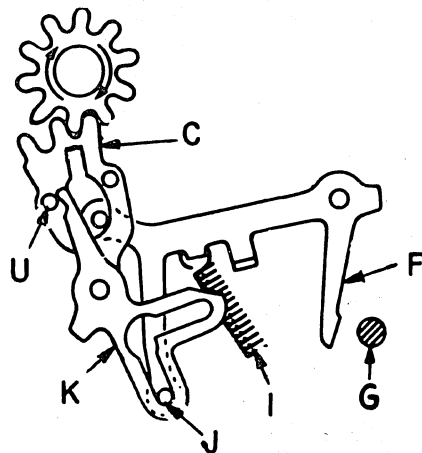


Fig. V-26

A4-11 With the pinion assembly in a lowered position and the front pinions active, carry racks C should have full side hold on the front pinions. In count sections the carry racks should have no less than $\frac{3}{4}$ side hold on the front pinions when the pinions are in normal or shifted position.

To Adjust Bend the carry rack.

Reason To ensure continuous mesh as carry racks actuate pinions to carried position.

A3-23 Carry racks C and directional bails K. should be free and have side play between the accumulator separator plates.

To Adjust Spread the bail portion of the carry racks.

Reason To maintain alignment of component parts and ensure free action.

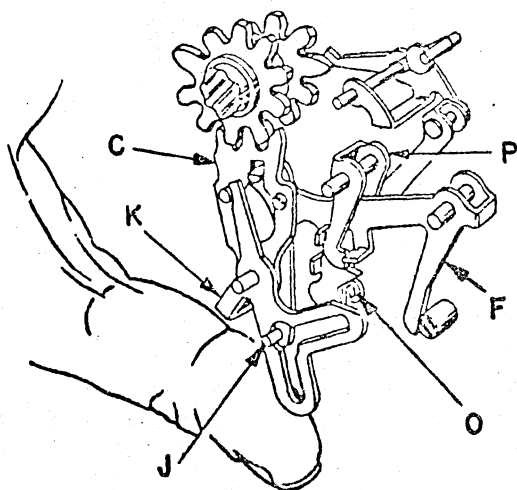


Fig. V-27

✓ **A3-28** With the pinion assembly in the raised position and the reset assembly limiting against latches H, Hold directional bail K lightly in the subtract position (upward) and turn the pinion slowly in the add direction. Latch P should release driver F when the upper corner of the apex of the enclosed cam in bail K is in line with the centre of stud J.

To Adjust Weave latch P as required.

Reason To ensure correct timing and direction of carries.

A3-29 Latch P should have overlift after releasing driver arm F. With the pinion assembly in a raised position, test each column manually on the add side. With pinion assembly in a lowered position, release a subtract carry in the first column and test for a run through carry slowly, on the subtract side.

To Adjust Recheck adjustment A3-28.

Reason To ensure release of driver arms F during a machine operation.

A3-24 When the accumulator is at normal, the apex of the enclosed cam K should have no more than .010" passing clearance with stud J.

To Adjust Weave the lower portion of carry driver F to tilt stud J up or down.

Reason To ensure detenting directional bail K in either add or subtract, initial carry position.

A3-20 Note: To prevent binding when the accumulator section is actuated before carry reset is adjusted, there should be maximum clearance between right and left adjusting screws M and carry reset shaft, with the section at normal.

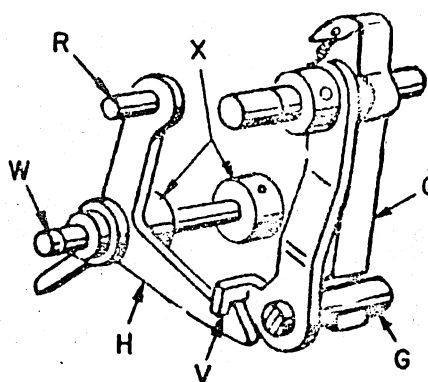


Fig. V-28

A4-12 Carry reset shaft latches H should be free and have no more than .008" side play.

To Adjust Loosen two set collars X between separator plate and left latch H. Place an .008" gauge on the outside of latch H on the right side of the CF and a .003 gauge on the outside of latch H on the left side of the CF. Push shaft W against the .008" gauge and tighten collars X against the separator plate and the left latch H.

Reason To ensure latching action for the carry reset bail.

A3-27 When latches H on the right and left are simultaneously latching the carry reset shaft in initial carry position there should be .016" GO to .020" NO GO clearance between the tails of drivers F and the carry reset shaft (rotate shaft to check for high or low spots).

Note : Check for the carry reset shaft to limit simultaneously on both latches H by cycling the machine to carry reset position (approx. 105° of a subtract operation) and proceed as follows :

a. When right latch H is disengaged, the left latch should hold and the right latch should not reengage the formed ear.

b. When left latch H is disengaged, the right latch should hold and the left latch should not reengage.

TO ADJUST, bend formed ears V for overall adjustment; bend the tails of the carry drivers F for individual column adjustment.

REASON: To permit the carry driver to move to initial carry position.

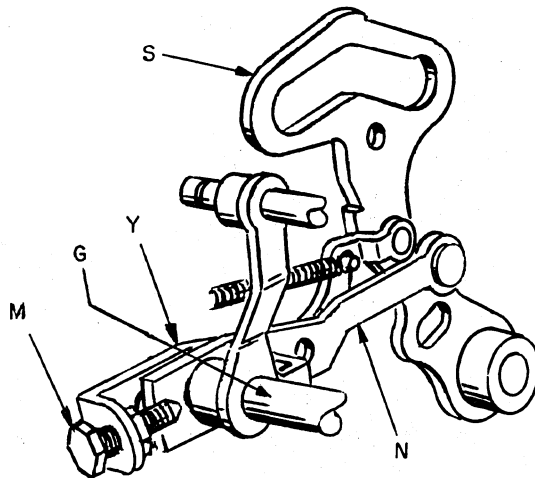


Fig. V-29

A4-28 With a subtract cycle of the machine to an initial carry position, trip-off all carries to ensure that the formed ears V are limiting against latches H, there should be .010" to .020" clearance between screws M and shaft G. Then with driver arms F reset to their maximum overthrow without binding, check each driver latch to reset and clear the ear of the driver arm by no less than .008".

TO ADJUST, starting with .015" between M and G, turn M as required maintaining the same clearance on right and left side.

REASON: To provide sufficient movement of shaft G to reset drivers F on their latches.

NOTE: On machines with single reset slide

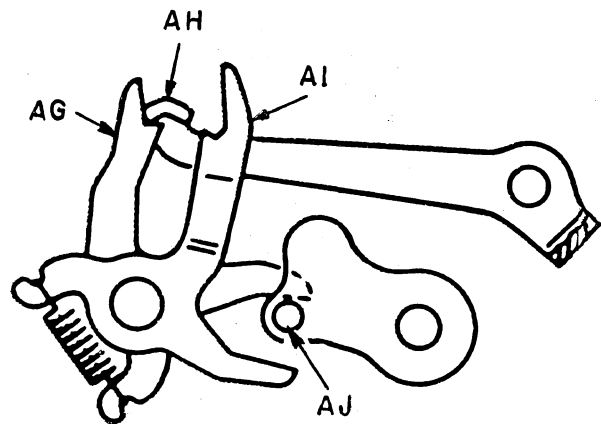


Fig. V-30

construction, there should be no less than .003" clearance of screws M and shaft G when V is limited by H and there should be perceptible overthrow of drivers F over their latches when the high point of the cams are rocked back and forth to reset the drivers.

REASON: To ensure resetting the carry drivers on their respective latches.

A4-22 When the crossfooter is at normal, the formed ear of "automatic one" carry driver AH should have .005" to .010" clearance over the steps of latches AG and AI.

TO ADJUST, weave the arm of "automatic one" carry driver AH up or down.

REASON: To ensure that either latch AG or AI can position under driver AH to prevent an automatic one when the capacity of the crossfooter is exceeded.

A4-23 When the pinion assembly is in a raised position, the carry reset shaft is latched in initial carry position, and carry driver AH is limiting on the carry reset shaft, the formed ear of the carry driver should have a half to three quarter hold below the steps of latches AG and AI.

TO ADJUST, recheck adjustment A4-22.

REASON: To prevent latch AG or AI from trapping an automatic one when the nature of the crossfooter total changes.

NOTE: Latches AG and AI should have a full hold on formed ear of driver AH.

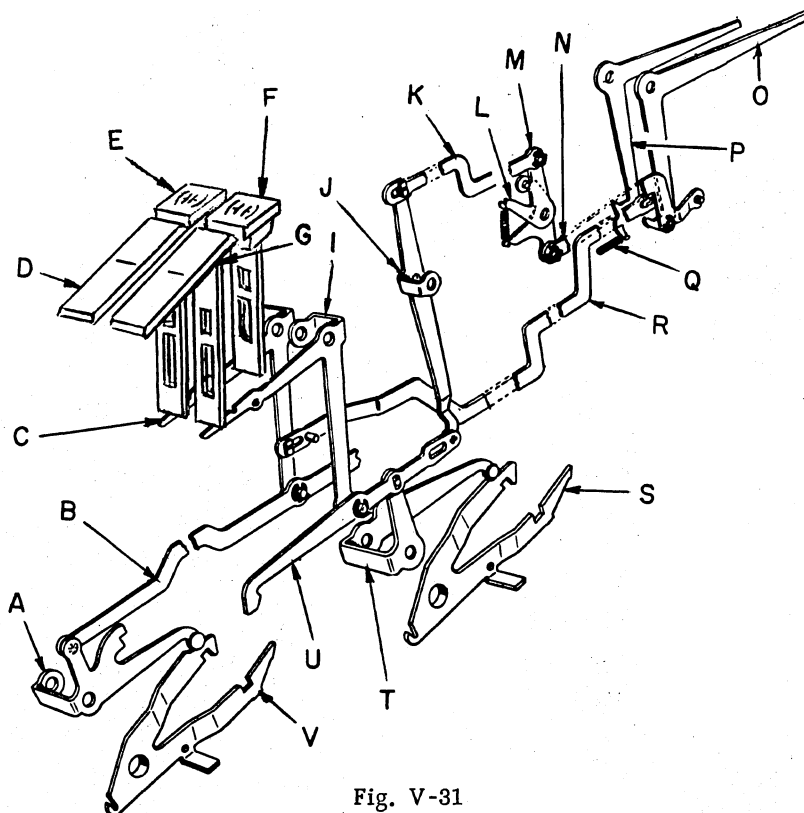


Fig. V-31

KEYBOARD AND CARRIAGE CONTROLLED INDEXING OF ACCUMULATOR FUNCTIONS

The accumulator meshing hooks are normally engaged with the add meshing control slide, therefore no controls are required to index an add operation.

Indexing Subtract and Non-Add

Keyboard controlled subtract operations of crossfooters "A" and "B" are indexed from depression of the subtract bars which lower the subtract meshing hooks into engagement with the subtract total meshing control slide. The subtract bars also trip the drive to index a machine operation, index shifting of the ribbon to permit printing in red, and index symbols to identify the accumulator function.

Keyboard controlled non-add operations are indexed from depression of the non-add keys which lower the accumulator meshing hooks into a neutral position, through the subtract linkage, to prevent meshing the accumulators with the adding racks.

Crossfooter "A" and "B" subtract or non-add operations are indexed in a similar manner. Separate control keys, linkages, and meshing hooks are used to index the functions for the appropriate accumulator through a common meshing control slide. Subtract or non-add operations may be indexed simultaneously in accumulators "A" and "B".

Crossfooter "A" and/or "B" subtract operations are indexed when depression of subtract bars D or G rocks levers C or I to move links B or U rearward rocking bails A or T. Bails A or T lower the upper arms of meshing hooks V (crossfooter "A") or S (crossfooter "B") into engagement with the square studs of the subtract/total meshing control slide, thereby permitting the crossfooter pinions to be meshed with the adding racks early in the machine cycle. This permits turning the pinions when the adding racks move forward, thus subtracting the indexed amount from the accumulators. Symbols are also indexed from bails A and T.

Crossfooters "A" and "B" non-add operations are indexed when depression of non-add keys E or F rocks levers C or I a shorter distance to position the meshing hooks into a neutral position to prevent meshing the accumulators.

Carriage controlled indexing of a subtract function in accumulator "A" and/or "B" occurs early in the machine cycle when a No. 5 control pin in lane 7 or 11 lowers the meshing hook into engagement with the subtract total meshing control slide. Lanes 7 and 11 are also used to provide carriage controlled indexing of non-add functions for accumulators "A" and "B" when No. 9A control pins are used to lower the meshing hooks into a neutral position. Symbols are indexed from the carriage controls to identify the accumulator functions.

Accumulator "A" or "B" subtract operations are indexed when a No. 5 control pin in lane 7 or 11, through the Carriage Control Sensing Unit, rocks bellcrank P or O. Bellcrank P lowers the upper (subtract/total) arm of meshing hook V into engagement with the subtract/total meshing control slide through spring Q, link R, lever C, link B, and bail A for accumulator "A" subtract operations. Bellcrank O lowers the upper (subtract/total) arm of meshing hook S into engagement with the subtract/total meshing control slide through link N, broken joint assembly L, link K, lever J, link U, and bail T for accumulator "B" subtract operations.

Accumulator "A" or "B" non-add operations are indexed in the same manner except a No. 9A control pin is used in lane 7 or 11. The No. 9A control pin, being shorter than a No. 5 control pin, provides less movement to bellcrank P or O. As a result the lower (add) arm of meshing hook V or S is disengaged from the add meshing control slide, but the upper arm of meshing hook V or S is not moved far enough to engage the subtract/total meshing control slide. This permits the pinions to remain in their lowered position during the machine cycle.

Indexing Totals

Crossfooter "A" or "B" totals are indexed from depression of the total keys which lower the subtract meshing hooks into engagement with the subtract/total meshing control slide to permit meshing the indexed accumulator early in the machine cycle. The total keys also trip the drive to index a machine operation, index the total

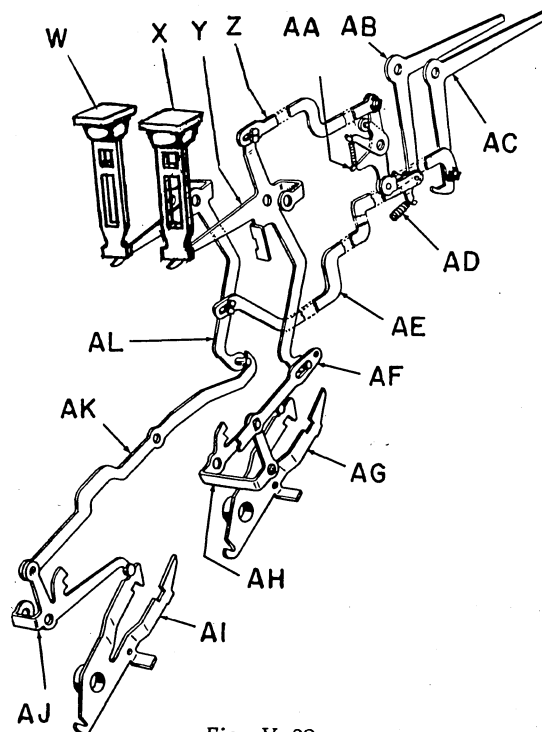


Fig. V-32

limit bail to provide a limit for the accumulator pinions, and retain the index strips in their normal nine position to permit the adding racks to move forward until they limit, through the accumulator pinions, on the total limit bail. Holding the index strips in their normal nine position also permits taking totals and subtotals when keys are depressed in the keyboard. Symbols are also indexed to identify the accumulator function.

Crossfooter "A" or "B" total operations are indexed when depression of total keys W or X rocks levers AL or Y to move links AK or AF rearward rocking bails AJ or AH to lower the upper arms of meshing hooks AI or AG into engagement with the square studs of the subtract/total meshing control slide, thus indexing meshing of the indexed accumulator. Symbols, which identify the total operation, are also indexed from bails AJ and AH.

Carriage controlled indexing of total functions in accumulator "A" or "B" occurs early in the machine cycle when a No. 5 control pin in lane 6 or 10 lowers the meshing hook to engage the subtract/total meshing control slide. The No. 5 control pin also activates the index strip lock

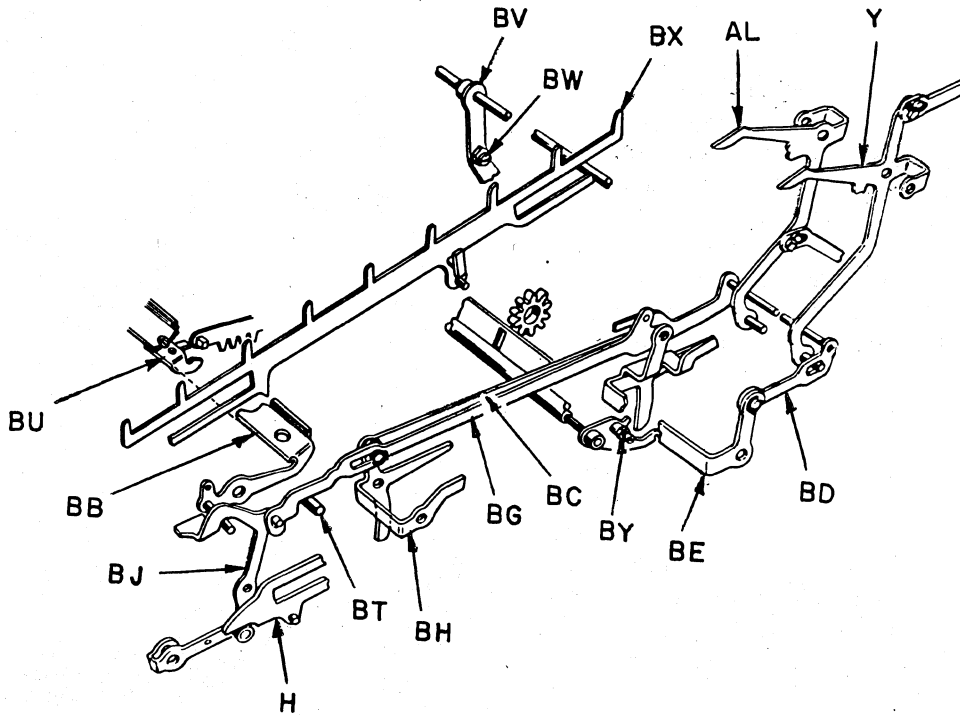


Fig. V-33

bail and total limit-bail, and positions the total symbol limit.

Accumulator "A" or "B" total functions are indexed when a No. 5 control pin in lane 6 or 10 rocks bellcrank AB or AC through the Carriage Control Sensing Unit. Bellcrank AB lowers the upper arm of meshing hook AI into engagement with the subtract/total meshing control slide through spring AD, link AE, lever AL, link AK and bail AJ for accumulator "A" total operations. Bellcrank AC lowers the upper arm of meshing hook AG into engagement with the subtract/total meshing control slide through broken joint assembly AA, link Z, lever Y, link AF and bail AH for accumulator "B" total operations.

Rocking of levers AL or Y also moves links BG or BC rearward, positioning the formed ear of lever BJ over the stud in index strip lock bail BB. A projection of link BG limits on post BT to prevent overthrow of the link and possible interference with the red ribbon and minus balance mechanisms.

At the approximate 27 degree point in the machine cycle, the forward movement of minus balance control slide H rocks lever BJ and swings index strip lock bail BB into the path of the lower projections of index strips BX.

Since the listing capacity of the machine is normally one digit less than its totaling capacity, the adding rack in the leftmost column (extended total) is blocked from moving forward during listing operations through lower projection BU on the index strip lock bail. The projection blocks the adding rack through a stud in the forward portion of the adding rack. During total and subtotal operations, upward movement of the index strip lock bail raises the projection out of the path of the stud in the adding rack, thus permitting the adding rack to move forward to clear the amount out of the extended total column in the accumulator. The projection on the index strip lock bail also limits the upward movement of the bail to prevent interference with the index strips that are not to be blocked by the lock bail.

Rocking of levers AL or Y also rocks bails BE or BH to position the lower projections of the bails over eccentrics BY. When the accumulator pinions are rocked upward into mesh with the adding racks, eccentrics BY limit on the lower projections of bails BE or BH and swing total limit bail BZ into the path of the long teeth of the accumulator pinions CA, thus providing a limit for the accumulator pinions, adding racks, and type bars.

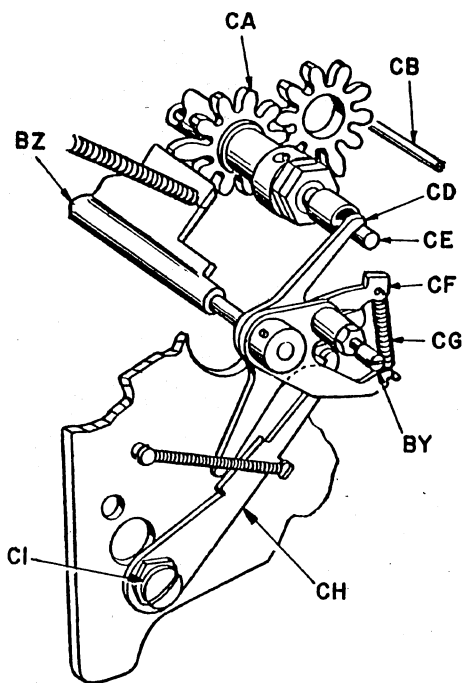


Fig. V-34

The total limit bail is limited in its normal and indexed positions by the arms of latch plate CF and CD, which limit on pinion shaft CE. The total limit bail is latched in its indexed position by latch CH to prevent the bail from being cammed out of position by the long teeth of the accumulator pinions. The latch is released by the forward projection of latch plate CF as the total limit bail is restored, by spring tension, to normal when the pinion assembly is lowered. Spring CG provides a yielding connection between the total limit bail BZ and meshing hook control bail BE.

Symbols identifying the total operations are indexed by bail BH and BE.

Indexing Subtotals

Crossfooter "A" or "B" subtotals are indexed in a similar manner to indexing totals. Depression of a subtotal key lowers the subtotal meshing hook into engagement with the subtotal meshing control slide to permit meshing the indexed accumulator. The subtotal keys also index the total limit bail, the index strip lock bail, index symbols to identify the machine function, and trip the drive to index a machine operation.

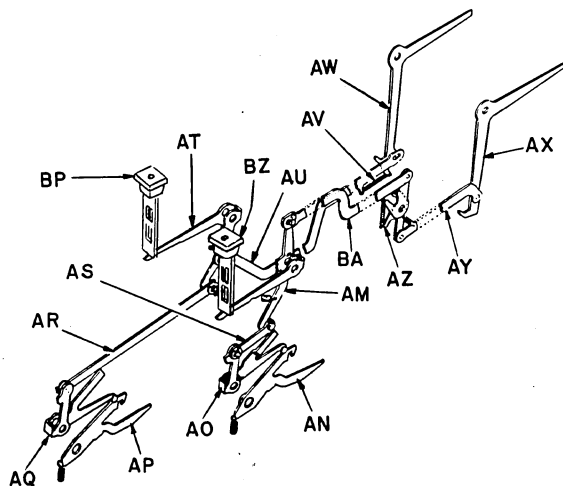


Fig. V-35

Crossfooter "A" or "B" subtotal operations are indexed from depression of subtotal keys BP or BZ which rock levers AT or AM to move links AR or AS rearward rocking bails AQ or AO to lower the upper arms of meshing hooks AP (Crossfooter "A") or AN (Crossfooter "B") into engagement with the square studs of the subtotal meshing control slide.

Subtotal functions are indexed in accumulator "A" or "B" when a No. 5 control pin in lane 8 or 9 lowers the subtotal meshing hook into engagement with the subtotal meshing control slide. The No. 5 control pin also indexes the index strip lock bail and total limit bail, and positions the symbol limit.

Accumulator "A" or "B" subtotal functions are indexed when a No. 5 control pin in lane 8 or 9, through the Carriage Control Sensing Unit, rocks bellcrank AW or AX. Rocking of bellcrank AW lowers subtotal meshing hook AP into engagement with the subtotal meshing control slide through spring AV, link AU, lever AT, link AR, and bail AQ for accumulator "A" subtotal operations. Bellcrank AX lowers subtotal meshing hook AN into engagement with the subtotal meshing control slide through link AY, broken joint assembly AZ, link BA, lever AM, link AS and bail AO for accumulator "B" subtotal operations.

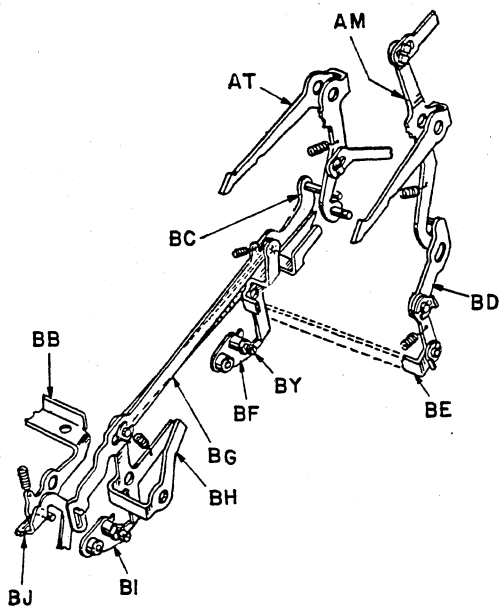


Fig. V-36

Rocking of levers AT or AM also moves links BG or BC rearward to position the formed ear of lever BJ over stud in BB to index the index strip lock bail; and rock bails BE or BH to position their lower projections over eccentrics BY to index the total limit bail.

Subtotal symbols are indexed by the upper projections of bails AQ and AO.

Accumulator Control Interlocks

When carriage controlled accumulator functions are to be reversed or errors corrected during an accounting operation, interlocks, between the control keys on the keyboard and the corresponding lanes of control for accumulator functions, permit the control keys to have precedence over some carriage controlled indexing of accumulator functions. The interlocks are provided for each column of control keys and prevent simultaneous keyboard indexing and carriage controlled indexing of functions in one accumulator.

Since keyboard indexing of accumulator functions occurs before the machine starts to cycle and carriage controlled indexing occurs after the machine starts to cycle, depression of a control key will cause the interlock to be positioned to block the carriage controlled indexing linkages.

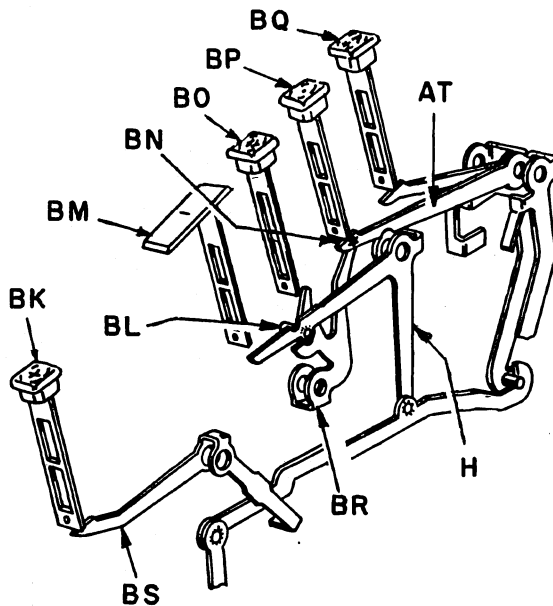


Fig. V-37

Carriage controlled indexing of subtract, non-add, and total functions in an accumulator is prevented by interlock BS when add control key BK, for the same accumulator, is depressed. Add key BK rocks interlock BS to position the formed ear of the interlock behind the step of link B, thereby preventing the link from being moved rearward from carriage controls.

Carriage controlled indexing of non-add or subtotal functions for an accumulator is prevented by depression of subtract key BM or total key BQ for the same accumulator. Depression of the subtract or total key rocks lever H to position stud BL in the forward pocket of interlock BR. This retains interlock BR in its forward position so that the rear arm of the interlock can block lever AT to prevent indexing a subtotal operation from a lane of control. Subtract and non-add functions in the same accumulator are indexed through the same linkage (the subtract indexing providing the most movement of the linkage) therefore, keyboard indexing of subtract functions has precedence over carriage controlled indexing of non-add functions.

Carriage controlled indexing of subtract functions in an accumulator is prevented by depression of non-add key BO for the same accumulator. Non-add key BO rocks interlock BR to position the forward projection of the interlock under stud BL.

This blocks lever H from being moved beyond the non-add position when the carriage controlled subtract linkage is actuated.

When subtotal key BP is depressed, carriage controlled indexing of subtract, non-add, and total operations in the same accumulator are prevented. Subtotal key BP rocks interlock BR through lever AT and stud BN position the forward projection of interlock BR under stud BL to block lever H. Carriage controlled non-add operations are prevented since the add/subtract meshing hook is normally moved to non-add position by depression of the subtotal key.

Tests and Adjustments

NOTE: Basic adjustments for Sensimatic Control Unit, Sensing Camshaft, and normal location of Sensing Bellcranks to ensure latching of the indexed bellcranks must be made prior to the following tests and adjustments.

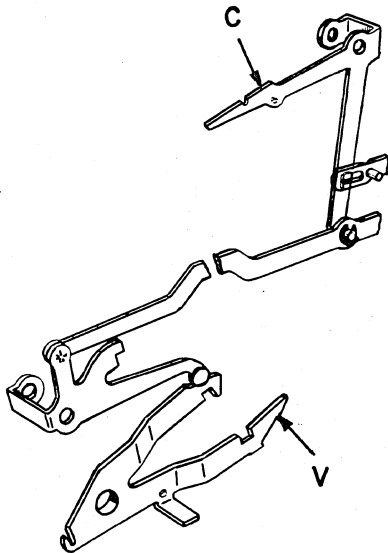


Fig. V-38

A29-2-1 With "A" or "B" subtract bar depressed to latch on the second step of the keyboard locking slide, meshing hook V should have at least a $3/4$ hold on the square stud in the subtract-total slide.

TO ADJUST, bend forward arms of bellcranks C. REASON: To ensure a safe ($3/4$) hold of meshing hook V on the square stud in the subtract-total slide during subtract operations.

NOTE: With "A" or "B" subtract bar manually held fully depressed, meshing hook V should not bind on the square stud in the subtract-total slide.

A29-2-2 With "A" or "B" non-add key depressed to latch on the second step of the keyboard locking slide, meshing hook V should be rocked to the neutral (non-add) position.

TO ADJUST, recheck sensing lever bellcrank adjustment (CI-3) in the power section.

TO ADJUST, recheck adjustment No. A29-2-1. REASON: To prevent meshing hook V from engaging either the square stud on the subtract-total slide, or the square stud on the add control slide during a non-add operation.

A29-2-3 With a No. 9A pin active in lane No. 7 or No. 17, cycle the machine until the sensing lever receives its maximum movement. Meshing hook V should be rocked to the neutral (non-add) position.

REASON: To prevent meshing hook V from engaging either the square stud on the subtract-total slide, or the square stud on the add control slide during carriage controlled non-add operations.

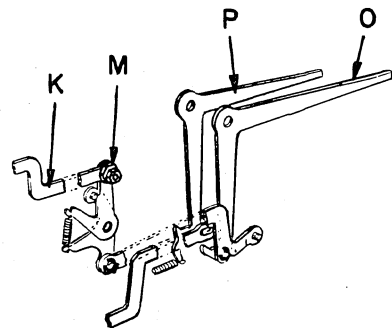


Fig. V-39

A29-2-4 With meshing hook V held in its normal add position, there should be no play in the carriage controlled linkage of lane No. 11.

TO ADJUST, turn eccentric M in link K.

REASON: To prevent meshing hook V from engaging either square stud on the subtract-total slide, or the add control slide during carriage controlled non-add operations.

NOTE: Over-adjusting of eccentric M will move meshing hook V from its normal add position.

A29-2-5 NOTE: With the carriage controlled bellcranks of subtract lanes No. 7, No. 11, or No. 17 latched by the latch plate, meshing hook V should have at least a $\frac{3}{4}$ hold on the square stud in the subtract-total slide.

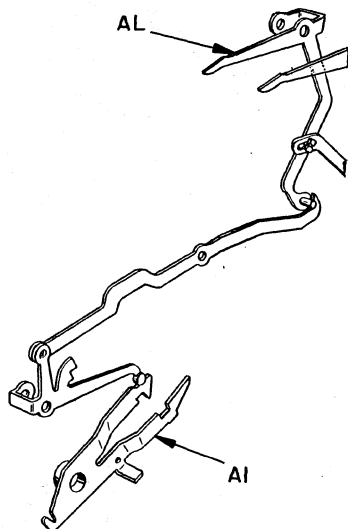


Fig. V-40

A29-1 With "A" or "B" total key depressed to latch on the second step of the keyboard locking slide, meshing hook AI should have at least a $\frac{3}{4}$ hold on the square stud in the subtract-total slide.

TO ADJUST, bend the forward arms of bellcranks AL under the keysterns.

REASON: To ensure at least a $\frac{3}{4}$ hold of the meshing hooks on the square studs in the subtract-total slide during the total operations.

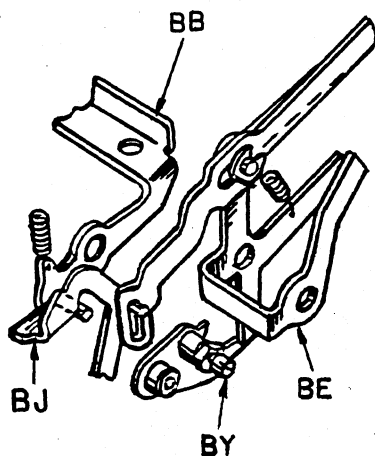


Fig. V-41

NOTE: With "A" or "B" total key manually held fully depressed, meshing hook AI should not bind on the square stud in the subtract-total slide.

A29-2 With "A" or "B" total key depressed to latch on the second step of the keyboard locking slide, there should be clearance not to exceed .003" between eccentric screw BY in the total limit bail and arm BE.

TO ADJUST, starting with the high side forward, turn eccentric screw BY as required.

REASON: To ensure sufficient movement of the total limit bail to limit the long teeth of the pinions in the cipher position.

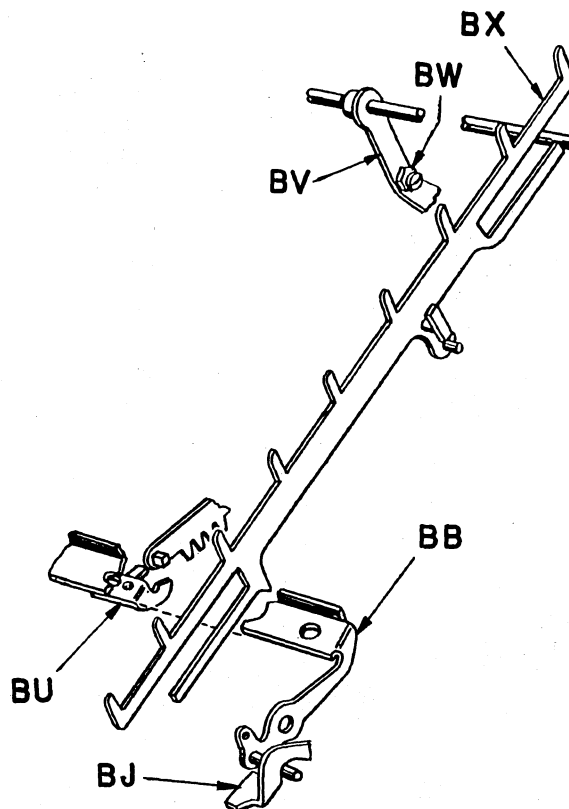


Fig. V-42

A29-3 With "A" or "B" total key depressed to latch on the second step of keyboard locking slide and the machine cycled to 25° , index strip lock bail BB should limit but not bind against the front guide comb.

TO ADJUST, bend the formed ear of lever BJ.

REASON: To ensure full index of index strip lock bail BB during total operations.

NOTE: If the strip lock bail BB contains a right and left limit and if either does not contact the guide comb there should be no more than .015" clearance between the limit that does not contact the guide comb.

A29-4 With the machine normal and the upper roller of BV limiting against the restoring cam, manually rock bail BB upward. BB should have no less than .015" clearance behind the projection on BX.

TO ADJUST, turn eccentric BW.

REASON: To enable blocking the index strips during total and subtotal operations.

NOTE: After making this adjustment, check for at least .003" clearance between arms BV and the rear guide combs and index strips not to limit on the front guide comb.

A29-4A NOTE: Manually rock bail BB upward and cycle the machine. The formed ears of the add racks should clear the No. 8 step of the index rack by no less than .010".

REASON: To permit the formed ears of add racks to move to the No. 9 position of the indexes.

A29-5 With index strip lock bail BB normal, and the projection of BU aligned with the square stud of the extended total rack and rear roller on BV limiting on the cam, there should be no less than .003" clearance between the projection and the square stud and with the machine cycled to 120°, the stud in the rear section of the extended total rack should enter freely into the tooth space of the lock plate.

TO ADJUST, bend vertical portion of the projection on BU as required.

REASON: To ensure free entry of the stud in the rear section of the extended total rack into the tooth space of the lock plate.

A29-6 With "A" or "B" total key depressed to latch on the second step of the keyboard locking slide, manually operate the machine. There should be no less than .010" clearance between the projection on BU and the square stud on the extended total rack.

TO ADJUST, bend the horizontal portion of the projection on BU as required.

REASON: To permit the extended total rack to move forward during total operation.

NOTE: Recheck test No. A29-5.

A29-7 NOTE: With the carriage controlled bell-

crank to total lanes No. 6, No. 10 and No. 20 latched by the latch plates, meshing hooks AI should have at least a 3/4 hold on the square

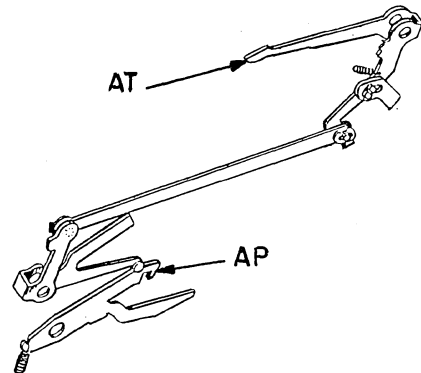


Fig. V-43

studs on the subtract-total slide.

A29-1-1 With "A" or "B" sub-total key depressed to latch on the second step of the keyboard locking slide, meshing hook AP should have at least a 3/4 hold on the square stud in the subtotal slide.

TO ADJUST, bend the forward arm of bellcranks AT under the keystems.

REASON: To ensure at least a 3/4 hold of meshing hook AP on the square stud in the sub-total slide during sub-total operation.

NOTE: With "A" or "B" sub-total keys manually held fully depressed, meshing hooks AP should not bind on the square stud in the sub-total slide.

A29-1-2 With "A" or "B" sub-total key depressed to latch on the second step of the keyboard locking slide, meshing hook AI should be rocked to the non-add position.

TO ADJUST, bend the formed ear of meshing hook AI as required.

REASON: To prevent meshing hook AI from engaging the square stud on either the total-subtract slide or the add control slide during sub-total operations.

NOTE: Recheck tests No. A29-2 through A29-6.

A29-1-3 NOTE: With the carriage controlled bellcranks of sub-total lanes No. 8, No. 9 or No. 23 latched by the latch plates, meshing hook AP should have at least a 3/4 hold on the square stud in the sub-total slide.

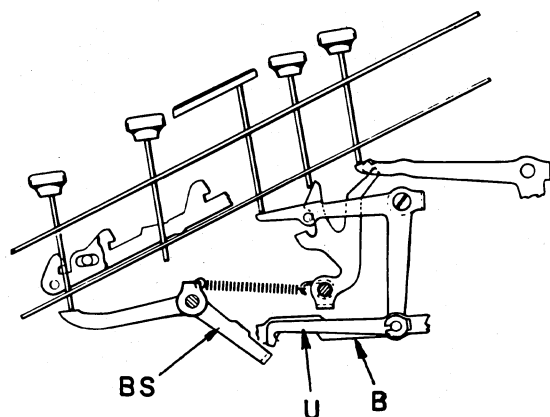


Fig. V-44

A29-3-1 With "A" or "B" add key depressed to latch on the step of the keyboard locking slide, the formed ears of bellcranks BS should have at least a full side hold on the projections of links U.

TO ADJUST, bend the rear arms of bellcranks BS.
REASON: To ensure at least a full side hold of bellcranks BS on the projections of links U.

A29-3-2 With "A" or "B" add key depressed to latch on the step of the keyboard locking slide, the formed ears of bellcranks BS should have at least a 1/2 vertical hold on the projection of links U.

TO ADJUST, tip the formed ears of bellcranks BS.
REASON: To ensure at least a 1/2 vertical hold of bellcranks BS on the projections of links U to block the carriage controlled non-add and subtract mechanism.

A29-3-3 With "A" or "B" add key depressed to latch on the step of the keyboard locking slide, manually raise the sensing bellcranks in lanes No. 7, No. 11 and No. 17 to firmly limit the projections of links U against the formed ears of bellcranks BS. Meshing hook AI should maintain 3/4 hold on the stud in add control slide.
TO ADJUST, bend the formed ears of bellcranks BS.

REASON: To prevent movement of the meshing hook AP from its normal (add) position.

A4-5 When the pinion assembly is in a raised position and arm CD is held against shaft CE, check the long teeth of all front pinions to have a full hold and the short teeth to clear bail BZ.

TO ADJUST, bend arm CD for earlier or later contact of shaft CE.

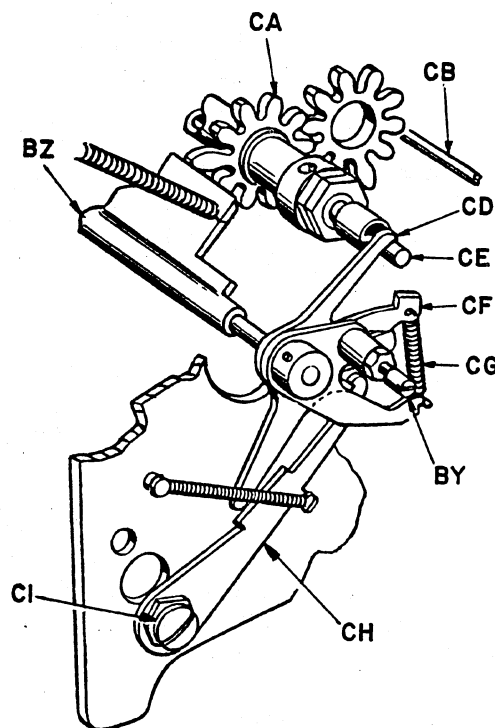


Fig. V-45

REASON: To prevent interference with rotation of pinions during totaling operations and provide safe limit for long teeth of pinions during add totaling operations.

A4-6 With the pinion assembly in a raised position and the total limit bail held by latch CH, there should be .003" to .006" clearance between arm CD and shaft CE.

TO ADJUST, turn eccentric CI.

REASON: To provide latching clearance for latch CH.

A4-7 The complete pinion assembly should have slight side play between the sideframes of the crossfooter.

TO ADJUST, use shims on the left end of the complete pinion assembly pivot shaft as required.
REASON: To maintain correct alignment and freedom of pinion section when meshing with adding racks.

MINUS BALANCE MECHANISM

The minus balance mechanism shifts the rear set of crossfooter pinions into active position in

line with the adding racks prior to meshing the pinions with the adding racks, thus providing a means of obtaining minus totals and subtotals. The minus balance mechanism also indexes the red ribbon and appropriate symbols to identify the accumulator function.

Partial indexing of the minus balance mechanism, through the Automatic One Mechanism, occurs during a subtract operation in which the subtracted amount exceeds previously accumulated add amounts.

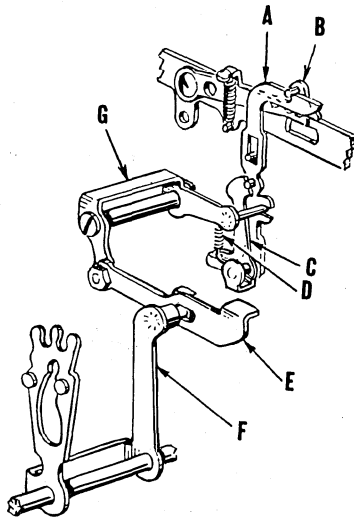


Fig. V-46

When the Automatic One Mechanism indexes a subtract carry in the first column, carry rack F moves link E rearward and, through bail G, lowers slide A to its minus position clear of the stud in pawl B. The slide is retained in position by detent C and spring D.

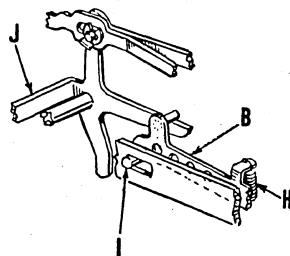


Fig. V-47

During a total or subtotal operation, the total linkage rocks bail J lowering its rearmost projection to permit spring H to swing the step of pawl B into the path of stud I in bail Q.

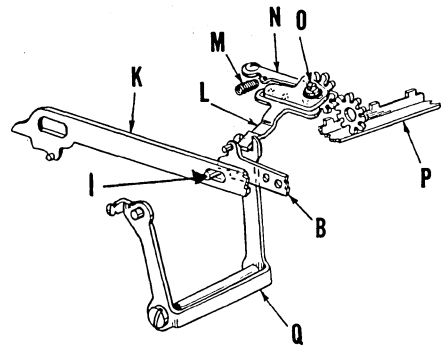


Fig. V-48

At the approximate 27 degree point in the machine cycle, the forward movement of minus balance control slide K rocks bail Q through pawl B. Bail Q through lever assembly L shifts the rear set of crossfooter pinions into active position. The pinions are retained in position by detent N and spring M. When the rear set of pinions is in active position during minus total and subtotal operations, the long teeth of the pinions limit on the projections of stationary minus total limit bail P.

NET ACCUMULATION MECHANISM

The net accumulation mechanism permits the transfer of minus totals from accumulator "A" to another accumulator as minus amounts so that the receiving accumulator can provide a net total of transferred amounts. Since an accumulator will normally add, plus amounts can be transferred from accumulator "A" to another accumulator without providing a carriage control for the receiving accumulator. The net accumulation mechanism, indexed by the automatic one mechanism and actuated by a carriage control in lane 16, indexes a subtract operation in the receiving accumulator when the amount being transferred is a minus amount. Lane 16 control should be accompanied by a result operation in accumulator "A".

Variation of the net accumulation mechanism provide for the accumulation of only plus amounts (Plus Net) or only minus amounts (Minus Net) in the receiving accumulator.

When a minus balance is created in accumulator "A", the partial indexing of the minus balance mechanism results in the partial indexing of

the net accumulation mechanism. Then as the machine cycles, lane 16 will be indirectly connected to the subtract lane of control for the receiving accumulator. Lane 16 can then actuate the subtract lane of control for the receiving accumulator to index the subtract function.

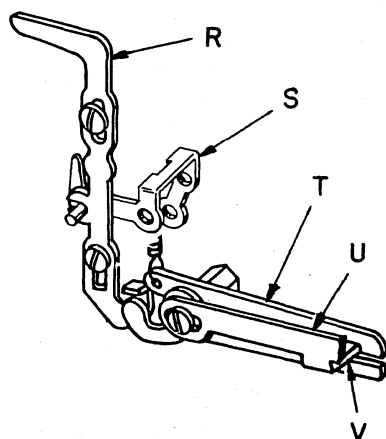


Fig. V-49

Partial indexing of the net accumulation mechanism occurs when the nature of the total in accumulator "A" changes from plus to minus. When the minus automatic one mechanism lowers slide R, the formed ear of the slide rocks latch T clear of formed ear V so that link U will be free to move rearward during the machine cycle. The lower arm of latch T limits overthrow of the latch so that rebound of the latch will not restore slide R to a plus position.

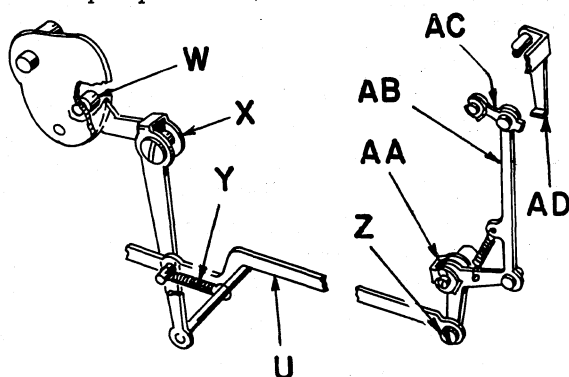


Fig. V-50

Complete indexing of net accumulation occurs early in the machine cycle when link U is moved rearward through roll W, lever X and spring Y. Link U, moving rearward, positions pawl AC in front of the formed ear of bail AD through bellcrank AA and link AB.

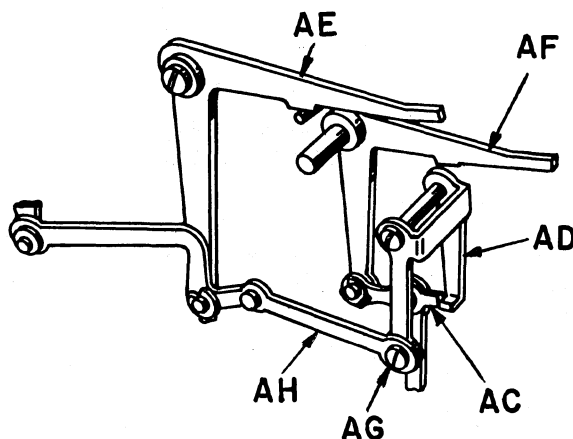


Fig. V-51

After net accumulation has been indexed, a No. 5 control pin in lane 16 will actuate the mechanism by rocking bellcrank AF through the Carriage Control Sensing Unit. Movement of bellcrank AF drives pawl AC against the formed ear of bail AD to rock bellcrank AE through link AH. Rocking of bellcrank AE causes its respective linkage to index a subtract operation in the receiving accumulator. When accumulator "A" is in an add condition, pawl AC is held below the formed ear of bail AD as the machine cycles. This prevents the No. 5 control pin in lane 16 from actuating the subtract lane of control for the receiving accumulator when a plus amount is being transferred.

The variations in the net accumulation mechanism (Plus Net or Minus Net) may be obtained by changing the control pins in the Sensimatic Control Unit. Plus Net is provided in the receiving accumulator by a No. 7 control pin in lane 16. The No. 7 control pin, being shorter than a No. 5 control pin, indexes a non-add function in the receiving accumulator when a minus amount is transferred from accumulator "A". Minus Net is provided in the receiving accumulator by a No. 5 control pin in lane 16 and a No. 9A control pin in the subtract lane of control for the receiving accumulator. When the amount being transferred is plus, the No. 5 control pin in lane 16 will be inactive and the 9A control pin will cause a non-add operation to be indexed in the receiving accumulator. When the amount being transferred is minus the No. 5 control pin in lane 16 moves the subtract linkage for the receiving accumulator farther than the 9A pin so that a subtract operation is indexed.

Tests and Adjustments

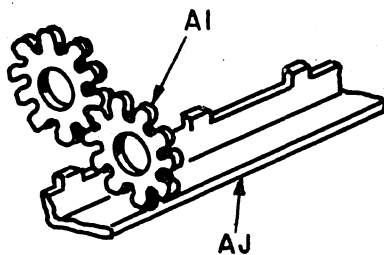


Fig. V-52

A4-11 The long teeth of the rear pinions AI should have no less than $3/4$ hold on the top and at least $1/2$ side hold on the projections of the total stop bail AJ.

TO ADJUST, bend the projections of the minus total bail forward or rearward.

REASON: To provide a positive limit for the rear pinions during a minus total operation.

A4-12 When the pinion assembly is in a raised position and rear pinions AI are in shifted position, the short teeth of the rear pinions, when rotated, should clear the projections of the minus total bail.

TO ADJUST, check adjustment A4-11.

REASON: To permit full rotation of the rear pinions without interference.

A4-13 With the long teeth of the rear pinions held against the minus total limit bail and the front pinions meshed with the carry racks, cross-slide the front and rear pinions. The long teeth of the rear pinions should clear the beveled corner of the projections on the minus total limit bail.

TO ADJUST, recheck adjustment A4-11.

REASON: To prevent interference when cross-shifting the pinions.

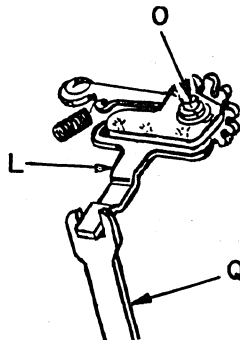


Fig. V-53

A4-30 With the crossfooter at normal, lever L should not bind in the fork of bail Q.

TO ADJUST, loosen screw O and reposition lever L.

REASON: To ensure full shifting of the pinions during a minus total operation.

A20-1 There should be equal play in bail S in the positive and negative positions. This test should be made when manually holding slide R in its positive or negative position.

TO ADJUST, weave bail S.

REASON: To maintain bail S in correct relationship to its component parts.

A20-2 With slide R in its upward (plus) position, and the hooked portion of latch T over the formed ear of link U, manually hold upward on bellcrank AF to move pawl AC rearward. There should be .005" to .010" clearance of pawl AC under the formed ear of bail AD.

TO ADJUST, turn eccentric screw Z in link U.

In machines which do not contain screw Z weave bellcrank AA.

REASON: To prevent accumulator "B" or "C" subtract-total meshing hook being lowered during an "A" accumulator plus total operation.

A20-3 With slide R in its lower (minus) position, the hook portion of latch T should have .005" to .015" clearance over the formed ear V.

TO ADJUST, weave link U up or down.

REASON: To allow link U to move rearward during an "A" accumulator credit balance total.

A20-4 With slide R in its lower (minus) position, manually raise bellcrank AF and move pawl AC rearward. Pawl AC should have a full hold on the formed ear of bail AD.

TO ADJUST, recheck adjustment A20-2.

REASON: To ensure moving bail AD during an "A" accumulator credit balance total.

A20-5 With a No. 5 pin active in lane 16 and the crossfooter in credit balance position, lever X should start to move rearward at approximately 10° to 12° of the machine cycle.

TO ADJUST, weave the arm of lever X to tilt its stud forward or rearward as required.

REASON: To allow sufficient time for slide R to locate in credit position following a crossfooter run through carry operation.

A20-6 With a No. 5 pin active in lane 16 and the crossfooter in credit balance position, pawl

AC should contact and start to move the formed ear of bail AD at 20° to 30° of the machine cycle.

TO ADJUST, turn eccentric screw AG in link AH. In machines which do not contain screw AG weave bail AD.

A20-7 With a No. 5 control pin active in lane 16 and crossfooter "A" in credit balance position manually cycle the machine. Subtract bellcrank in lanes No. 11 or No. 17 should latch behind latch plate with at least .005" latching lead. TO ADJUST, recheck adjustment No. A20-6. REASON: To ensure at least a $3/4$ hold of the meshing hook on the square stud of subtract-total slide.

INDEXING SYMBOLS TO IDENTIFY ACCUMULATOR FUNCTIONS

Symbols which identify the various accumulator functions of the machine are indexed from depression of the various accumulator control keys or from carriage controlled indexing of accumulator functions. Separate symbols are indexed for each accumulator. Indexing of the various accu-

mulator control linkages positions projections of the symbol designator arms into the paths of formed ears on the symbol indexing racks for each accumulator. The symbol indexing racks, which are meshed with intermediate gears, raise the symbol type bars through the cluster gear unit.

Indexing of symbols results when the accumulator control linkages lower the projections of symbol designator arms A and B (corresponding to the operation indexed) into the path of the formed ears of symbol indexing racks L (crossfooter A) and K (crossfooter B).

With the designator arms so positioned, rotation of cam C on the main camshaft permits springs F to move the symbol indexing racks forward to raise the indexed symbols into printing position through gears I, intermediate gears H, and corresponding gear E.

During an add operation when the symbol designator arms remain at normal, forward movement of the symbol indexing racks is limited by post J. Symbols which identify the other accumulator functions are indexed as indicated in the above illustration.

Restoration of the symbol indexing racks and lowering of the symbol type bars is accomplished during the latter portion of the machine cycle when cam C swings lever D rearward.

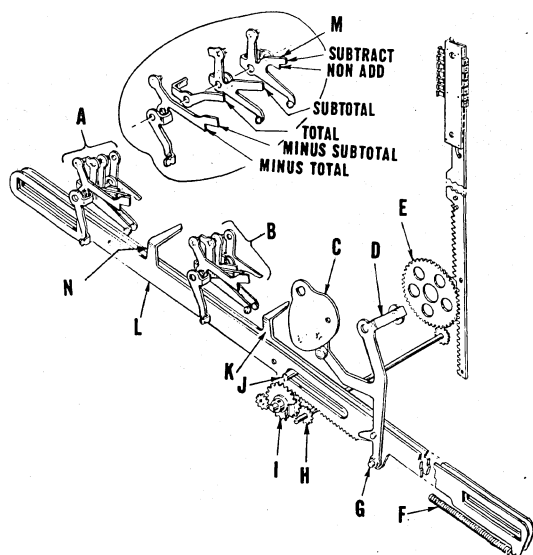


Fig. V-54

Tests and Adjustments

PR11-1 With result keys normal, cycle the machine. Formed ear N on the symbol indexing slides should have no less than .015" clearance under "Non-Add" symbol designator arms M for accumulators "A" or "B". With non-add keys depressed and the drive tripped, cycle the machine. Formed ears N on symbol indexing slides should have no less than a full hold on the non-add symbol designator arms for accumulators "A" and "B".

TO ADJUST, tip formed ears N on symbol indexing slides as required.

REASON: To ensure printing the correct symbol.

MULTIPLE TOTAL REGISTER UNIT

The register unit is designed on dimensions similar to a crossfooter so that it may be assembled into an accumulator position in the machine. If the register unit is considered as consisting of two general sections - a carry section and a pinion section - we find the carry section is the same as that studied in the crossfooter. In the pinion section, single pinion construction is used to facilitate cross-sliding the pinions. The single pinion construction prevents the use of an automatic one mechanism which results in complimentary totals and subtotals when subtracted amounts exceed added amounts in a register.

When the register unit is at normal home position, register No. 1 is in active position - i.e., the pinions of register No. 1 are in line with the

adding racks, carry racks, and carry pawls. When a register, other than register No. 1, is selected, the pinions are moved laterally on the pinion shaft from right to left. After a register has been selected, the pinions can be meshed with the adding racks to provide the required accumulator function. Controls are provided to control the pinions during cross-sliding as well as during meshing. Timing controls are also provided to latch and hold the selected register active until the end of the machine cycle.

Register units are constructed in two capacities, four total and nine total units. These units function in the same manner and are identical except for the differences required to utilize the full capacity of the pinion assembly with nine register construction.

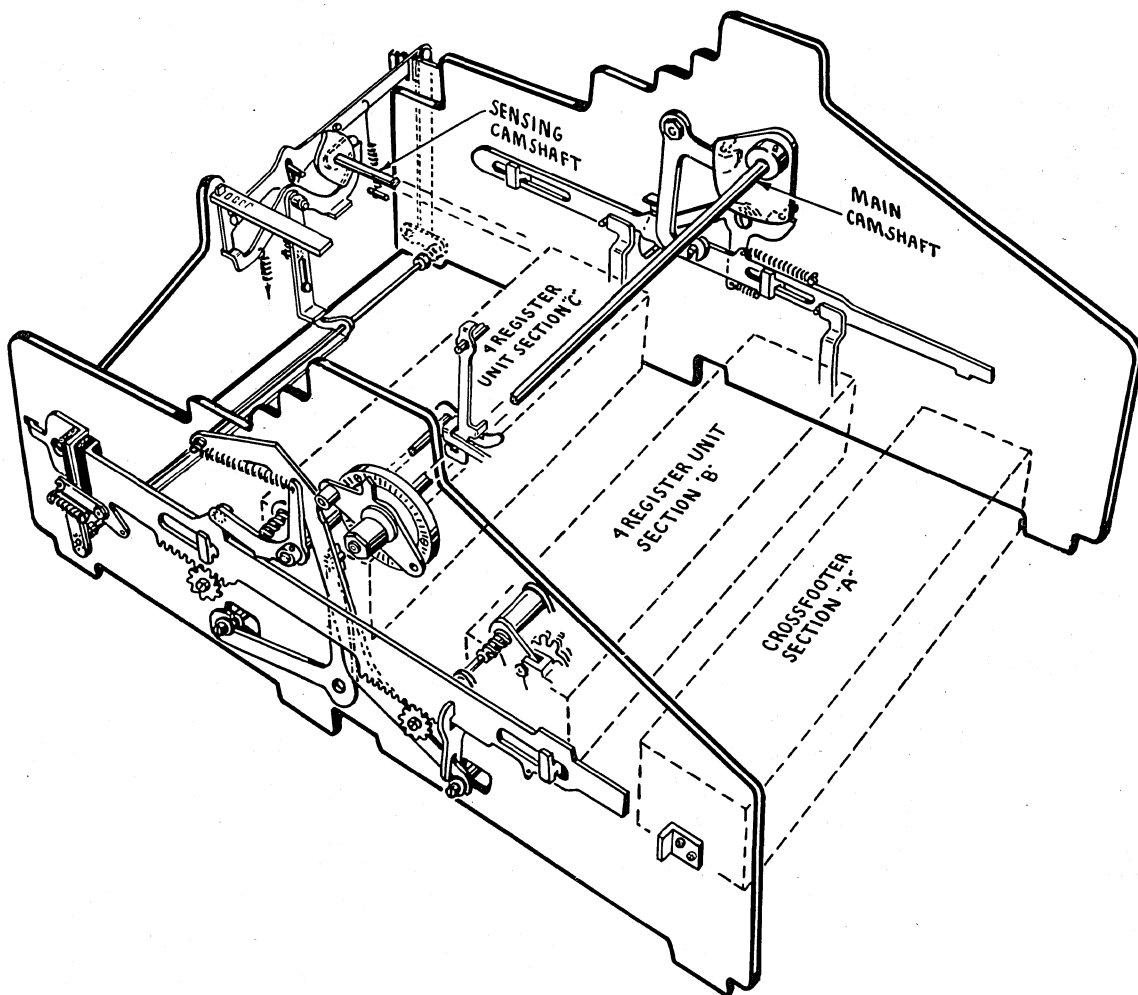


Fig. V-55

Series F200

The Series F200 machine is constructed with a crossfooter in accumulator position "A" and a four total register section in accumulator position "B", providing a possibility of at least five different totals. The increased accumulating capacity provides multiple totals for proof purposes at the completion of a predetermined group of postings.

The crossfooter in position "A" is used to compute the new balance of an account when amounts indexed during the posting operation increase or decrease the old balance. The individual registers in the register unit accumulate the indexed amounts as they are printed in columnar fashion across a ledger or journal sheet - i.e., an individual register, within the register unit, may be used to accumulate the amounts posted in a given column or columns on the ledger or journal sheet so that columnar totals are provided. Individual registers, within the register unit, are identified from left to right as register No. 1, No. 2, No. 3 and No. 4. They are further identified, when other accumulators are involved, as registers B-1, B-2, etc. Different length control pins, lo-

cated in lane 25 of stop positions corresponding to posting columns, actuate lane 25 to select the different registers. Since a register must be selected before accumulation occurs and the register must be restored to normal at the end of the machine cycle, timing controls are provided. An interlock insures that the register is fully restored to normal before the drive is tripped for a subsequent machine operation.

Series F400

The Series F400 machine has a crossfooter in accumulator position "A", a four total register unit in accumulator position "B", and a four total register unit in accumulator position "C", providing the possibility of at least nine different totals. The four additional totals provide for greater flexibility and proof possibilities in the application of the machine. The individual registers in "C" register unit are numbered from left to right and are referred to as registers C-1, C-2, etc. "C" registers are selected through the same register selection mechanism and simultaneously with "B" registers. Individual meshing controls are provided

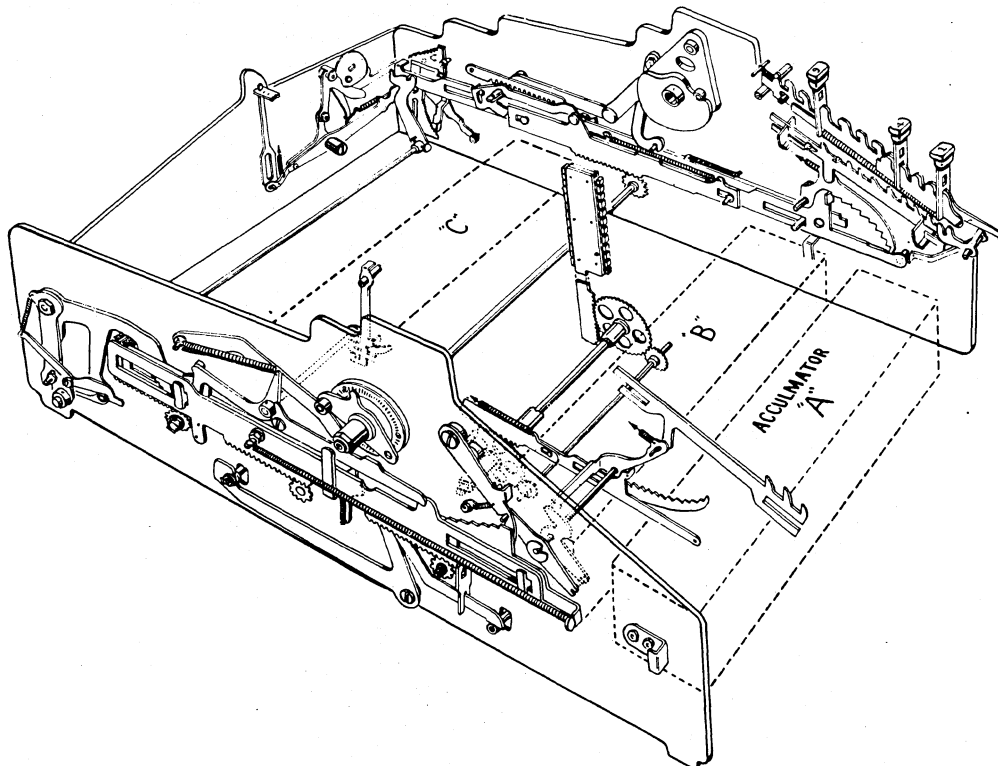


Fig. V-56

for "C" register unit to permit accumulator functions to be indexed independently of other accumulators.

Series F300

The Series F300 machine is constructed with a crossfooter unit in both accumulator position "A" and accumulator position "B", and a nine total register unit in accumulator position "C". This construction provides an accumulating capacity desired for machine applications requiring multiple totals for distribution of posted amounts, or for proof purposes at the completion of a predetermined group of posting. As in the F100 machine, the crossfooter in position "A" is used to compute the new balance of an account when amounts indexed during the posting operation increase or decrease the old balance. The crossfooter in position "B" provides a "working crossfooter" for computing an additional balance or for securing minus totals for proof purposes. Numbered registers of accumulator "C" (C-1 through C-9), selected through register index rack operation from the main camshaft, are indexed either automatically from carriage controls or manually from keyboard register selection keys. Carriage controlled indexing is from sensing camshaft operation, which positions the register index step plate from different length control pins in lane 25. Keyboard controlled indexing is from an index strip, which positions the keyboard index rack in column "0" from depressed register selection keys. These selected registers are identified by symbols, usually numbers 1 through 12 which print with accumulator symbols to the right of the carriage stop position, or, are identified by characters which print to the left of the amount section.

Series F500

The Series F500 machine is constructed with a crossfooter unit in accumulator position "A" and a nine total register unit in both accumulator position "B" and accumulator position "C". This construction provides a means of computing the account balance and provides eighteen individual accumulating registers for distribution of posted

amounts or for proof purposes. The use of identical register units in accumulator positions "B" and "C" simplify construction and operation; that is, numbered registers of section "B" and section "C" are selected from the same controls, simultaneously, and the active section is determined by a non-add of the other section. Identifying symbols describe the machine operation and designate the selected register and section.

Cross-Sliding the Pinion Assembly

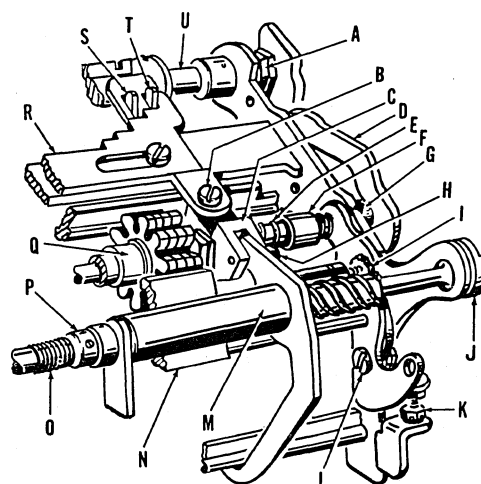


Fig. V-57

Rotation of spiral shaft J during the machine cycle causes spiral sleeve M to be moved, and through block C on pinion assembly Q, moves Q laterally so that the pinions of the selected register are in active position. The pinion assembly is retained in selected register position by pawl T or S engaging a step of plate R. Odd numbered registers are retained by pawl T and even numbered registers by pawl S. Aligning bail N maintains the alignment of all of the pinions in the pinion assembly during cross-sliding of the pinions to prevent interference between the pinions and the carry racks. Aligning bail N also stays in mesh with the pinions as the pinions are meshed with the adding racks to prevent inertia rotation of the pinions. Collar F provides an overthrow limit when register No. 4 is selected on four total construction.

Meshing the Pinions with the Adding Racks

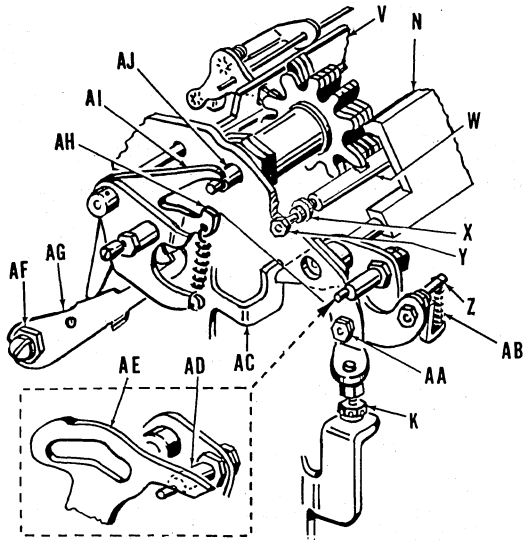


Fig. V-58

The pinions are meshed with the adding racks in the same manner and at the same time in the machine cycle as the crossfooter pinions, to provide the desired accumulator functions. As the pinions are moved upward and start to engage the adding racks, the projection on the rear of camming arm AE contacts eccentric stud AD, rocking aligning bail N out of mesh with the pinions to permit the active pinions to be turned by the adding racks. Rocking of bail N also causes the forward part of arm N to be raised above the formed ear of lever AC. While the pinions are in mesh with the adding racks, round aligner shaft W prevents the inactive pinions from turning to retain amounts in other registers. Slots in the shaft permit the active pinions to turn during accumulation. The round aligner shaft also serves as a spacer to permit free movement of aligning bail N.

Meshing the Pinions with the Carry Racks

After the adding racks have turned the pinions to provide the desired accumulation, the pinions are lowered to their normal home position, in mesh with the carry racks, to receive any possible carries. As the pinions start to move downward, spring AB rocks bail N into mesh with the pinions to again prevent any inertia rotation of the active pinions. When the pinions start to engage the carry racks, the forward projection of arm N con-

tacts the formed ear of lever AC to disengage aligning bail N from the pinions. This permits the carry racks to turn the pinions to accumulate any carries that may have been initiated. Limit pads K, on the right and left pinion assembly side-frames, establish the normal downward position of the pinions and cushion the downward thrust of the pinion assembly to permit free restoring of camming arms D and AE on the right and left sides.

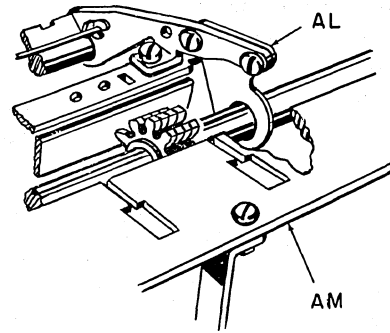


Fig. V-59

Brace AK is assembled on the pinion shaft of four register units to prevent downward bowing of the pinion assembly as the pinions are meshed with the carry racks. The brace also helps maintain the pinions at the proper height over the carry racks.

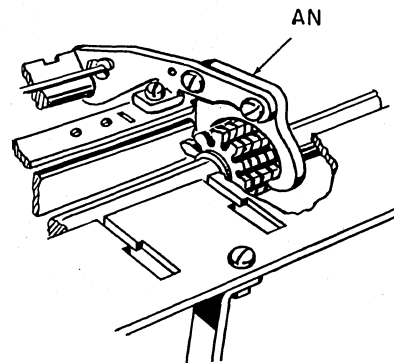


Fig. V-60

As the full capacity of the pinion sleeve is utilized for accumulating pinions, center brace AN is so designed with clearance for the pinion teeth as to permit the pinion assembly to cross-slide to register No. 9. This brace prevents downward bowing of the pinion assembly when the pinions mesh with the carry racks, thus maintaining proper depth mesh during a relay carry.

Tests and Adjustments

A3-1 The accumulator must limit squarely on all four lower projections of the right and left sideframes, when placed on a flat, even surface. TO ADJUST, loosen the two nuts and one screw holding the left sideframe of the accumulator and position as required. Retighten the nuts and screw.

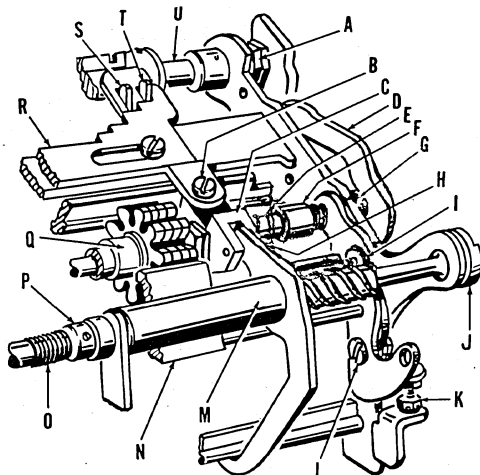


Fig. V-61

REASON: To ensure free action and alignment of parts.

A3-2 With rollers G limiting on the rearward end of the enclosed cams of arms D, the accumulator at normal, there should be clearance but no more than .004" between limit screw K and formed lips on the right and left side frames. TO ADJUST, loosen nuts and adjust limit screw K. REASON: To provide an overthrow limit which will prevent interference between the pinions and the carry racks as the pinion section is restored to normal.

A3-3 With the pinion assembly in a raised position and arm AI held against pinion shaft AJ, check the long teeth of the pinions to have a full hold and the short teeth of active pinions in any one register position to clear total limit bail V. TO ADJUST, bend arm AI for earlier or later contact of pinion shaft AJ. REASON: To provide a safe limit for the long teeth of the pinions and to prevent interference with the rotation of the pinions during totaling operations.

A3-4 With the pinion assembly in a raised position and total limit bail V latched on latch AG, there should be .003" to .006" clearance between arm AL and pinion shaft AJ.

TO ADJUST, adjust eccentric collar AF.

REASON: To provide latching clearance for latch AG.

A3-5 The pinion assembly should have .003" to .006" end play between the right and left sideframes.

TO ADJUST, turn hex nuts A on the left sideframe as required.

REASON: To maintain correct alignment and freedom of the pinion assembly when meshing with the add racks.

A3-6 With pinion assembly step plate R limiting against pawl T and register No. 1 active, the pinions of register No. 1 should align with the carry racks and have at least a flush alignment with the carry pawls.

TO ADJUST, loosen screw B and rotate the pinion sleeve in block C to align the pinions of register No. 1 with the carry racks. Bend any individual rack or pawl if necessary.

REASON: To establish the correct position of the pinions with reference to the adding racks, carry racks and carry pawls.

A3-7 The long teeth of the active pinions should have no less than .010" clearance with the sides of the slots of round aligner shaft W.

TO ADJUST; insert washers at right end of round aligner shaft W.

REASON: To ensure free rotation of the active pinions in the slots of round aligner shaft W.

A3-8 The active and inactive pinions must align laterally with the teeth of the carry racks, in normal, negative and positive carry position. Check alignment by cross-sliding the pinion assembly with slight pressure on the pinions forward and rearward.

TO ADJUST, with the pinions meshed with the carry racks and the aligning bail, adjust eccentrics L as required.

REASON: To prevent interference with lateral shifting of the pinion assembly.

A3-9 Total limit bail V should have no less than .004" passing clearance under the long teeth of the pinions with the long teeth at cipher position. TO ADJUST, recheck A3-8.

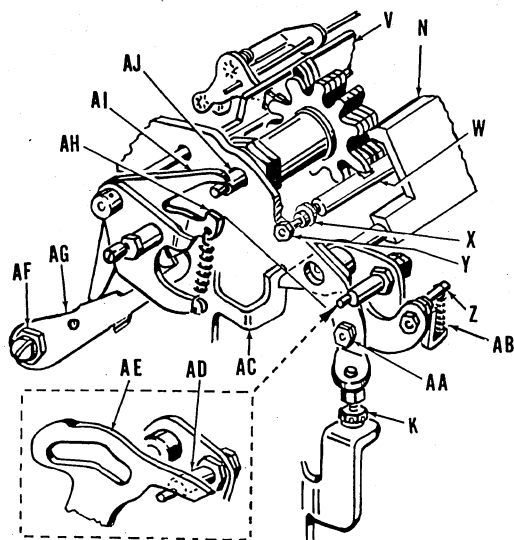


Fig. V-62

REASON: To prevent interference with the total limit bail when moving in to limit the pinions in cipher position during total operations.

A3-10 The inactive pinions should have .003" to .005" play on round aligner shaft.

TO ADJUST, loosen the nuts X and Y at each end of round aligner shaft W and move the aligner shaft up or down as required. Tighten inside nut X on the left end of the round aligner shaft against the end plate until .005" to .010" end play is obtained in aligning bail N. Tighten outside nuts Y at each end.

REASON: To prevent rotation of the inactive pinions and to ensure freedom of the pinion section when shifting laterally.

A3-11 Aligning bail N should have even contact of the pinions the full length of the bail.

TO ADJUST, weave aligning bail N as required.

REASON: To ensure holding the active pinions in alignment as the pinion assembly is moved into and out of mesh with the add or carry racks and also when cross-sliding.

A3-12 With the pinion assembly in a raised position, there should be .016" to .025" clearance between aligning bail N and the long teeth of the pinions.

TO ADJUST, adjust eccentric AD as required.

REASON: To ensure against interference with the long teeth as the pinions are rotated by the adding racks and to provide for the proper timing relationship as the aligning bail moves into the pinions.

A3-13 Worm gear shaft J should be free to turn. TO ADJUST, weave extended arm of the left side plate for alignment as required.

REASON: To provide free movement when shifting the pinion section.

A3-14 Cross-slide the pinion section by rotating worm gear J. The pinion section should be free to restore to normal under the power of spring O. Spring O should have two turns of tension with the pinion section in normal position.

TO ADJUST, rotate collar P as required and tighten the set screw in the collar.

REASON: To provide power for the return of the register pinion section to its normal position.

A3-15 Pinion block C should be free to move up and down on the arm of M with no more than .003" side play.

TO ADJUST, turn set screw H as required and tighten the lock nut.

REASON: To ensure immediate movement of the pinion section when selecting registers.

A3-21 With pawls S and T in active position, rotate worm gear J to position the pinion section in register two. The carry racks should have central alignment with the pinions.

TO ADJUST, bend the carry racks as required.

REASON: To ensure continuous mesh as the carry racks actuate the pinions to carried position.

A3-23 With pawls S and T in active position, rotate worm gear J to position the pinion section in register two. With the pinion assembly actuated to a raised position, the long teeth of the pinions should have a full hold on the carry pawls.

TO ADJUST, hold the total limit bail V in an actuated position and bend the carry pawls as required.

REASON: To ensure actuation of the carry pawls by the long teeth of the pinions.

A3-31 The right and left slots in guide AL should align with the active pinions.

TO ADJUST, position guide AL as required.

REASON: To ensure alignment of the pinions and adding racks.

FOUR REGISTER SELECTION

Carriage controlled selection of registers provides a means of separating accumulation of amounts when such amounts are indexed in different carriage positions. This mechanism is indexed

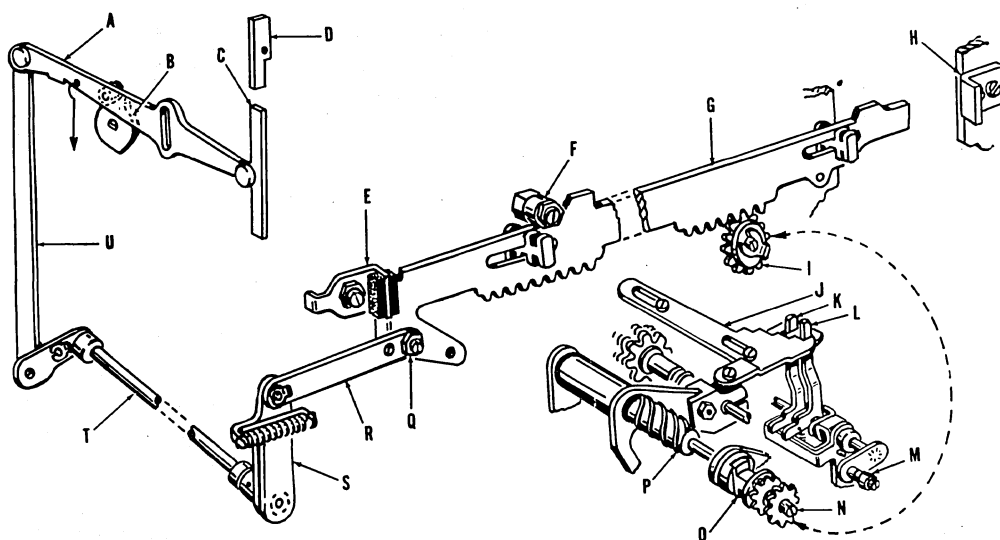


Fig. V-63

by control pins in lane 25 and operated by the sensing camshaft. The sensing lever action drives the register selection rack forward which in turn rotates the worm shaft to cross-slide the pinion assembly and position the selected register. Since register No. 1 is active when the register pinion assembly is normal, no control pin is required to select register No. 1. Registers No. 2, No. 3 and No. 4 are selected from control pins No. 5, No. 3 and No. 1 respectively. A control limit mechanism, indexed from the same camshaft, controls excess movement of the register selection rack. The index of detent pawls to retain the selected register in active position and the release to restore the selected register to normal through the timer slide, are controlled from the main camshaft. A drive trip interlock, controlled from the register selection rack provides a delay between machine cycles required for the pinion assembly to restore to normal from a higher numbered register position than register No. 2.

Indexing

Cam B and a cam arm on the sensing camshaft actuate register selection in lane 25 and the overthrow limit mechanism on the back plate. At the beginning of the machine cycle cam B raises sensing lever A. When tappet C limits on control

pin D further movement of the sensing lever, through link U, rotates shaft assembly T. The resulting forward movement of arm S and link R drives register selection rack G forward rotating gear I. The rotation of gear I, through coupler O, rotates worm shaft P to cross-slide the pinion assembly and position the selected register in line with the adding racks where it is retained by detent pawl K or L.

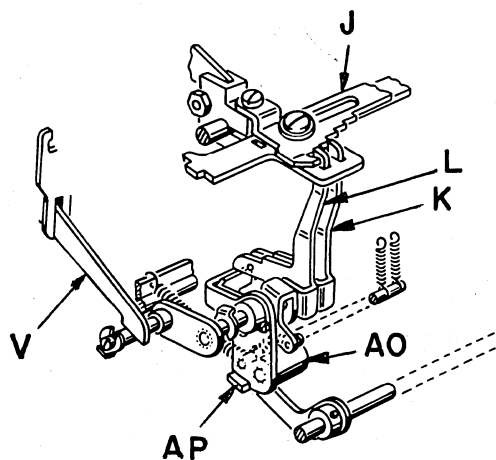


Fig. V-64

Early in the machine cycle, the roll on the cycle indicator pointer contacting lever V rocks the release hammer AO permitting detent pawls K and L to move rearward against the pinion as-

sembly step plate J to retain the selected register in active position.

Register Selection Rack Overthrow Limits

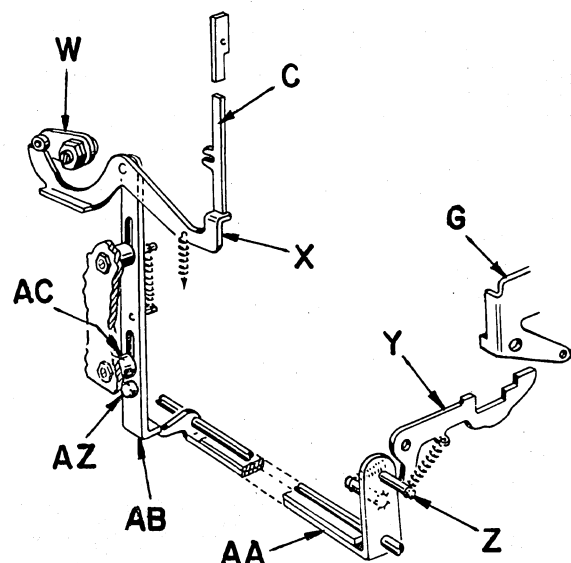


Fig. V-65

As register No. 1 is normal position of the pinion assembly, no control pin is required for selection of No. 1 register and no overthrow limit for register selection rack is necessary. The overthrow limit Y positions at normal against the lower edge of the formed ear of register selection rack G with its rear step aligned with the formed ear, to prevent overthrow of the register selection rack when selecting register No. 2. The rotation of cam arm W on the sensing camshaft rocks lever X which pivots on the vertical slide AB. When register No. 2 is being selected, tappet C limiting on a No. 5 control pin does not provide a limit for lever X. Consequently, the pivoting action of lever X imparts no downward movement to vertical slide AB and overthrow limit Y remains in normal position.

When selecting register No. 3, tappet C limited in a lower position by control pin No. 3 provides a limit for lever X. The rotation of cam arm W then imparts a downward movement to vertical slide AB. This action rocks bail AA and through the spring on stud Z positions overthrow limit Y to align its forward step with the formed ear of register selection rack G, thus ensuring selection of register No. 3.

When selecting register No. 4, tappet C limiting on a No. 1 control pin increases the downward movement of vertical slide AB resulting in overthrow limit Y being rocked downward out of the path of the register selection rack. Bracket H positioned on the left side frame limits the forward movement of register selection rack G.

Release of the Pinion Assembly and Restoring to Normal

At the end of the machine cycle, after accumulation and carries have been completed, timing controls release the pinion assembly to permit the pinions to restore to normal.

At the beginning of the machine cycle arm V rocks hammer AO, permitting pawl K or L to latch the pinion assembly in selected register position. Hammer AO is latched in its forward position by arm AP.

Also at the beginning of the machine cycle, rotation of the main camshaft causes timing slide AD to be moved rearward, against the tension of spring AI, through lever AF. The upper formed ear of latch AE holds the timer slide rearward. Therefore, during that portion of the machine cycle when the pinions move from the add racks into mesh with the carry racks, lever AK rocks aligning bail AJ out of mesh with the pinions to permit relay carries to take place.

Near the end of the machine cycle (approximately 345°) stud AH raises latch AE to permit slight forward movement of the timer slide. The lower formed ear of the latch, moving into the cutout in the timer slide, delays complete forward movement until the end of the machine cycle. As stud AH moves off the end of the latch, the timer slide moves forward to rock lever AK. Lever AK first moves away from aligning bail AJ to permit the aligning bail to engage the pinions before they cross-slide to normal. The bottom end of lever AK then rocks shaft AM to disengage arm AP from hammer AO. This permits the bail of the hammer to disengage pawls K or L from the pinion assembly: thus permitting the pinions to cross slide to normal. Auxiliary bail AN restores pawl L first if even numbered registers were selected and prevents rebound of pawl L when any register was selected to prevent trapping the pinions during restoration.

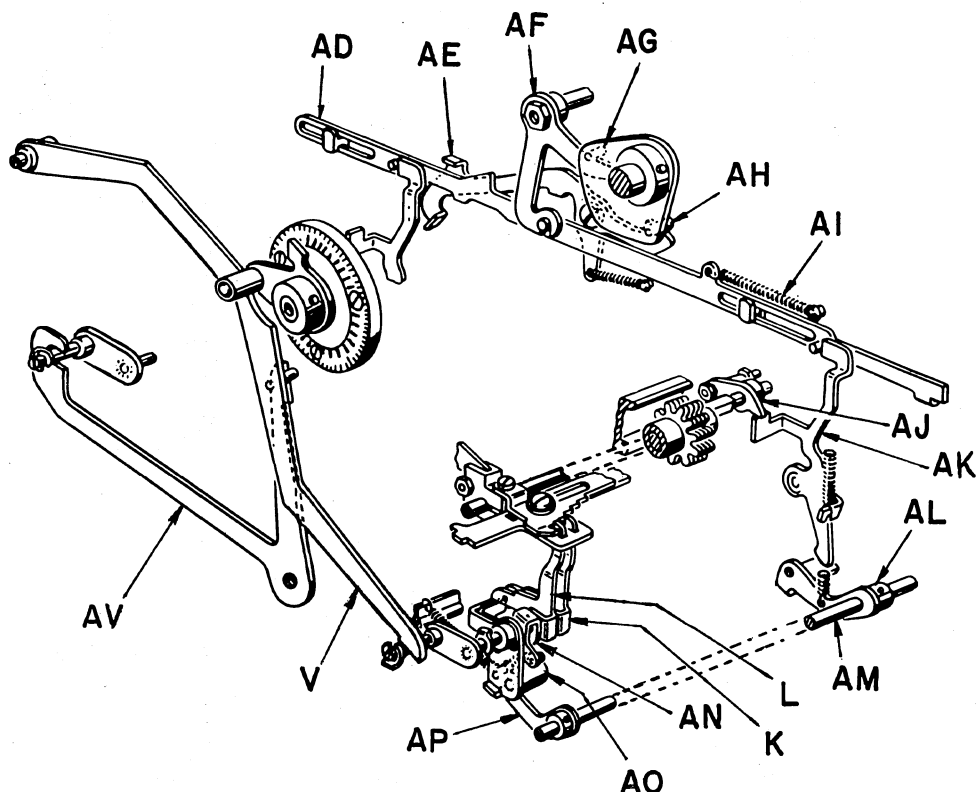


Fig. V-66

Simultaneous Index and Release of Register "B" and "C"

Since "B" and "C" register units are both engaged with the same register selection slide, the index and release of the registers is simultaneous. Lever AV, actuated by lever V, causes the release hammer of "C" unit to be indexed with the release hammer of "B" unit. The timer slide releases both hammers at the same time.

Drive Trip Interlock

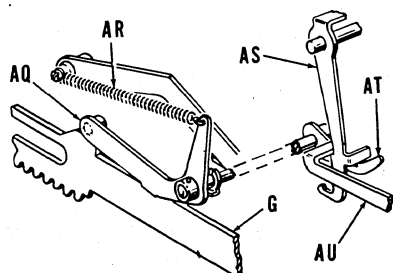


Fig. V-67

Early in the machine cycle as register selection slide G moves forward out of register one position, the cam surface on top of the slide moves out from under the roll on lever AQ. This permits spring AR to raise arm AT. Since the drive is already tripped, drive trip bail AS is in its forward position; thus arm AT limits on the formed ear of the drive trip bail. When the drive trip bail is restored to normal at the end of the machine cycle, the step of arm AT is positioned in front of the formed ear of the drive trip bail to prevent tripping the drive until the register section has restored to register No. 1 position. Restoration of the register selection slide lowers arm AT to permit the drive to trip.

Tests and Adjustments

A11-1 With the machine cycled manually, roll F should have no more than .003" clearance over rack G during full travel of the rack.

TO ADJUST, turn eccentric AX.

REASON: To limit the upward thrust of rack G insuring uniform relation with the steps of over-throw limit Y.

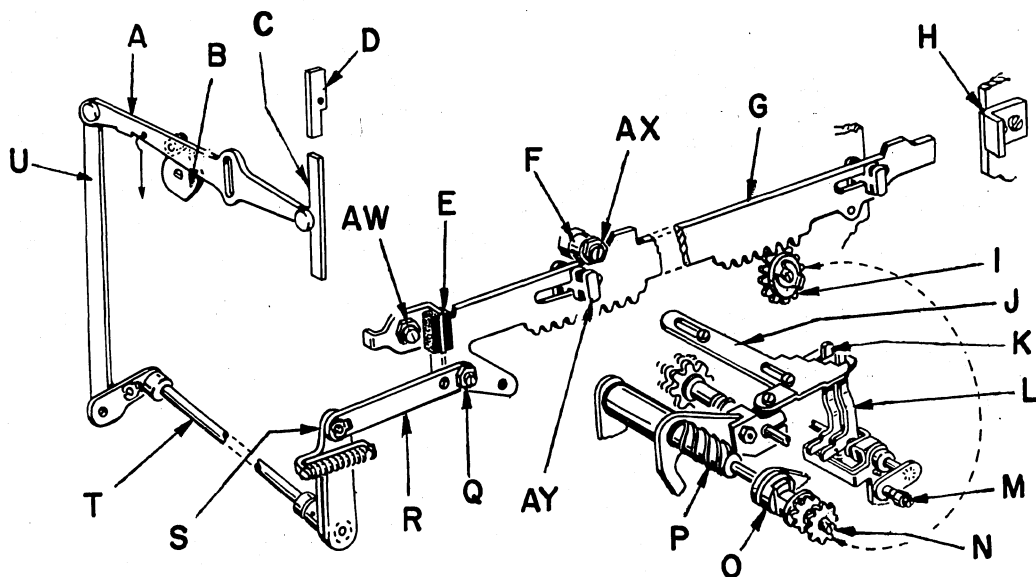


Fig. V-68

A11-2 With the machine normal and link R removed from stud of bracket S, there should be .093" clearance between the front edge of the rear slot in rack G and guide post AY. TO ADJUST, turn eccentric AW to position rubber bumper E. REASON: To establish the normal position of rack G.

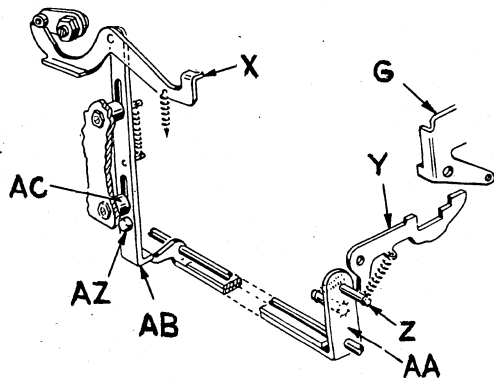


Fig. V-69

A11-3 With the machine at normal and a .016" gauge inserted between the limit pad of the sensing lever guide comb and lever A, turn the high side of lower eccentric AC down to avoid a false limit of tappet C. Hold lever A to limit tappet C against its bottom guide plate. Link R should enter freely over stud in S. TO ADJUST, turn eccentric Q. REASON: To provide clearance between the limit plate and sensing lever and to prevent the

tappet from bouncing up into the path of the pins in the control panel as the sensing lever restores to normal.

A11-4 With the machine at normal and lever A held manually to limit tappet C against its lower guide plate, and stud AZ limited upward against lower eccentric AC, there should be .003" clearance between tappet C and lips X. TO ADJUST, turn eccentric AC.

REASON: To prevent a false limit of tappet C at normal.

A11-5 With a No. 5 pin active in lane 25 and the machine cycled to 45°, there should be .003" clearance between tappet C and lip X. TO ADJUST, recheck A11-4.

REASON: To prevent slide AB from transmitting motion to overthrow limit Y.

A11-6 With a No. 3 pin active in lane 25 and the machine cycled to approximately 35°, the rear formed lip of rack G should have .015" to .020" clearance over the first step of limit Y.

TO ADJUST, weave the lower lip of slide AB. REASON: To prevent trapping rack G on the first step of limit Y and thus selecting a wrong register.

A11-7 With a No. 5 pin active in lane 25 and the machine operated electrically, there should be no movement of bail AA which would transfer motion to limit Y.

TO ADJUST, recheck A11-4 and 5.

REASON: To prevent wrong register selection.

A11-8 With a No. 1 pin active in lane 25 and the machine cycled to approximately 35° , the rear formed lip of rack G should have no less than .015" clearance over the second step of limit Y.

TO ADJUST, recheck A11-6.

REASON: To prevent trapping rack G on the second step of limit Y and thus selecting a wrong register.

A11-9 With a No. 1 pin active in lane 25 and the machine cycled to move rack G to its extreme forward position, there should be .005" to .010" clearance between the front of rack G and limit H.

TO ADJUST, weave limit H.

REASON: To prevent an overthrow of the register pinion section when selecting register No. 4.

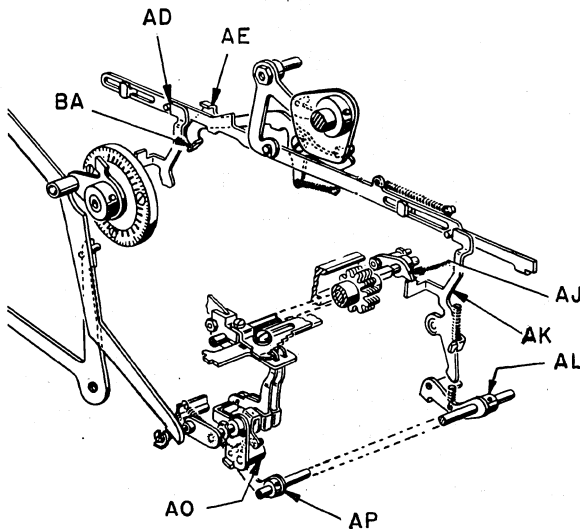


Fig. V-70

A3-16 With the machine at normal and timer slide AD manually held forward, manually rock release hammer AO. There should be .003" to .008" clearance between the lip on arm AP and the lower surface of release hammer AO.

TO ADJUST, bend the lip of arm AP up or down as required.

REASON: To ensure release of release hammer AO when timer slide AD is at its forward limit of travel.

aligning bail .003" to .006" prior to contacting the lip on arm AL.

TO ADJUST, bend lip of release arm AK.

REASON: To provide time for run through carries to take place before the aligning bail meshes with the pinions.

A3-18 With the pinion assembly in a normal position, aligning bail latched out of mesh with the pinions, the long teeth of the pinions positioned one space above the aligning bail and an add carry manually released, there should be .047" to .062" passing clearance between aligning bail and the long teeth of the pinions.

TO ADJUST, weave lip of AK up or down.

REASON: To prevent interference with the long teeth of the pinions as carries take place.

A28-1 NOTE: With the machine manually cycled to approximately 45° and timer slide AD in its rearmost position, there should be no less than .010" latching lead between the formed ear on latch AE and the step on timer slide AD. Timer slide AD should be released at approximately 355° by the lower formed ear BA.

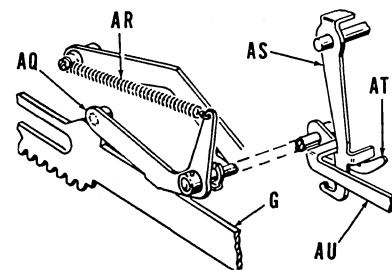


Fig. V-71

A11-14 With the machine normal and clutch release latch AS normal, manually lower overthrow limit Y and move rack G forward until the projection on the rack is clear of roll AQ. With roll AQ limiting on the horizontal portion of rack G there should be no more than .050" clearance between the formed ear of latch AS and the vertical surface of interlock AT.

TO ADJUST, weave the formed ear of latch AS.

REASON: To provide additional time between machine operations when selecting registers 3 or 4.

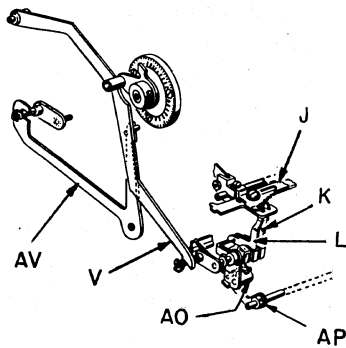


Fig. V-72

A11-10 Cycle the machine until arm V receives maximum throw (approximately 55°). Register hammer AO should have .010" to .030" latching lead over latch AP.

TO ADJUST, weave arm V for "B" register and AV for "C" register.

REASON: To latch detents L and K in active position.

A11-13 With rack G normal and hammer assembly AO rocked manually, outer detent L should move rearward with slight clearance of the No. 1 step on plate J. When slight pressure is applied to the right on plate J, detent L should "hang up". TO ADJUST, remesh gear I with rack G. If, after making the above adjustment, the register is not retained in No. 4 position by pawl L, return the machine to normal and relocate gear I by turning it counter-clockwise one tooth at a time.

REASON: To ensure positive indexing of the selected register.

CARRIAGE CONTROLLED "A" RESULT OPERATIONS DISABLED BY DEPRESSION OF "B" TOTAL KEY

On Series F200 machines, an interlock between the "B" total key and the "A" carriage controlled total linkage, permits manual totaling of the registers on the same schedule that is used for posting applications. This permits using all four schedules of the Sensimatic Control Unit for multiple job applications. When the "B" total key is depressed the interlock blocks the "A" carriage controlled total linkage and causes the "A" accumulator to non-add.

When the "B" total key is depressed, key lev-

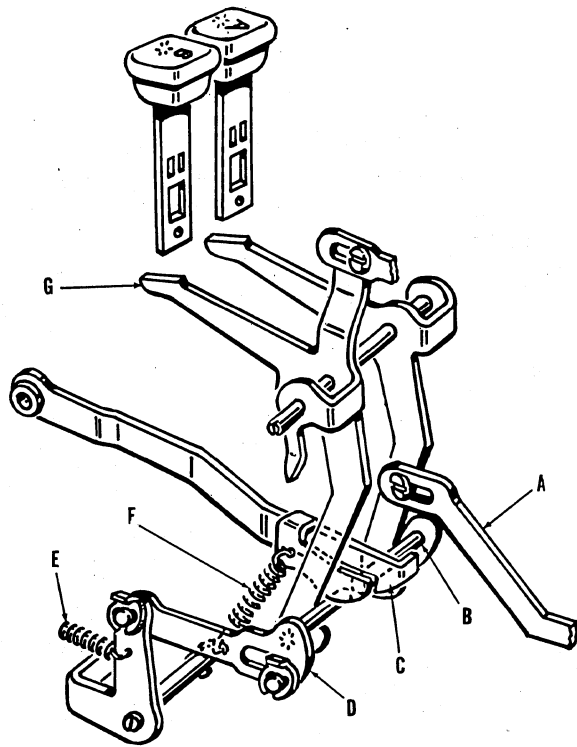


Fig. V-73

er G is rocked to move stud in D rearward. This permits spring F to lower interlock C. The step of interlock C, moving behind stud B, prevents link A from moving rearward to index an "A" total from carriage controls. The interlock does permit enough rearward movement of link A to move the "A" meshing hooks to non-add position and cause the non-add symbol to be indexed.

ACCUMULATOR "C" MESHING CONTROLS AND SYMBOL INDEXING

Greater flexibility is attained in Series F machines through use of a register section in "C" accumulator position. The provision for additional totals permits a wider range of machine applications. Keyboard controls in column "C" and carriage controls in lanes 17, 20 and 23 are provided to index the "C" accumulator functions and identifying symbols. "C" accumulator functions may be indexed simultaneously with "A" and "B" accumulator functions. Simultaneous keyboard and carriage controlled indexing of "C" accumulator functions is prevented by interlocks in the same manner as for other accumulators.

Accumulator "C" Subtract and Non-Add

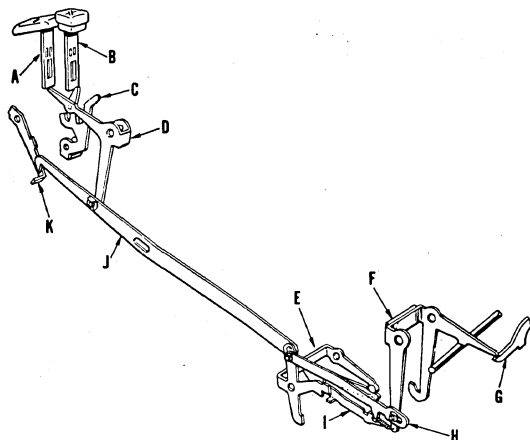


Fig. V-74

Subtract and non-add functions in accumulator "C" are indexed by keys A and B through the same linkage. When key A is depressed, the upper arm of meshing hook I is lowered into engagement with the subtract/total meshing control slide through bellcrank E and link J. Depression of key B provides less movement to meshing hook I; therefore, the lower arm of the meshing hook is disengaged from the add meshing control slide but the upper arm of the meshing hook is not engaged with the subtract/total meshing control slide.

Subtract and non-add functions of accumulator "C" are indexed from carriage controls in lane 17. A No. 5 control pin in lane 17 causes bellcrank F to rock and through link H and bail E lowers the upper arm of meshing hook I into engagement with the square stud on the subtract/total meshing control slide. A No. 9A control pin in lane 17, being shorter than a No. 5 control pin, provides less movement to bellcrank F, link H and bail E; therefore, the lower arm of meshing hook I is disengaged from the add meshing control slide but the upper arm is not moved far enough to engage the subtract/total meshing control slide.

Subtract and non-add symbols are indexed for "C" accumulator from bail E.

Accumulator "C" Total

Depression of key L causes a total function to be indexed in the "C" accumulator through lever

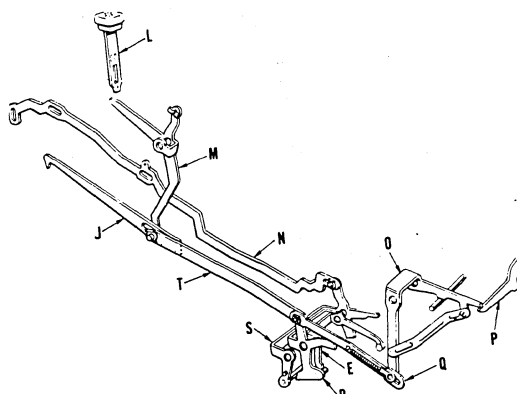


Fig. V-75

M, link T and bail R. The stud in bail R contacts and rocks subtract/non-add bail E to engage the meshing hook with the subtract/total meshing control slide. The forward projection of bail R rocks bail S to index the keyboard index strip lock bail through link N and also index the total limit bail of accumulator "C".

Carriage controls in lane 20 are connected directly to the keyboard total linkage for "C" accumulator so that a No. 5 control pin in lane 20 rocks bail R through bellcrank O and link Q. Bail R rocking causes the "C" accumulator meshing hook to be positioned for a total operation, the total limit bail to be indexed and the keyboard index strip lock bail to be indexed. The "C" total symbol is indexed from the arm of bail R.

Accumulator "C" Subtotal

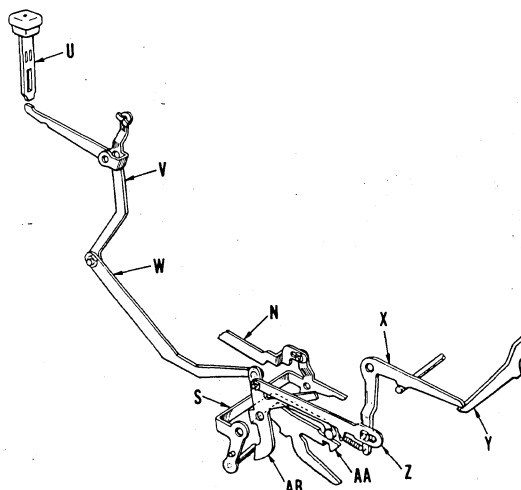


Fig. V-76

A subtotal operation for "C" accumulator is indexed from the keyboard when subtotal key U is depressed. The subtotal key lowers meshing hook AA into engagement with the subtotal meshing control slide through lever V, link W and bail AB. Downward movement of the meshing hook causes the subtract/total meshing hook to move to a non-add position. The lower projection of bail AB rocks bail S to index the total limit bail and to index the keyboard index strip lock bail through link N.

A No. 1 control pin in carriage control lane 23 is used to index a subtotal operation in "C" accumulator through bellcrank X, and link Z in the same manner as the subtotal key. The subtotal symbol is indexed from bail AB.

Symbol Indexing

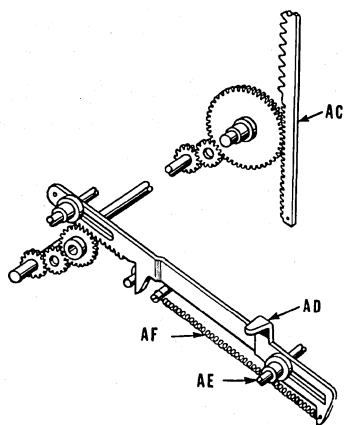


Fig. V-77

When a "C" accumulator function is indexed from keyboard or carriage control, a limit is positioned to limit the forward movement of symbol indexing slide AD. The symbol indexing slide, moving forward raises "C" symbol type bar AC to a symbol position corresponding to the accumulator function indexed.

Tests and Adjustments

NOTE: The tests and adjustments for the "C" accumulator functions and symbol designations are the same as those for the "A" and "B" accumulators explained earlier in this section.

NINE REGISTER SELECTION

The register selection mechanism constructed in the Series F300 - F500 machines provides a means of selecting registers of the nine register accumulator automatically from carriage control or manually from keyboard register selection keys. From sensing camshaft operation, control pins No. 1 through No. 8 in lane 25 index corresponding numbered steps of the register index step plate; from index strip movement, depressed keystems position an inverted keyboard index rack in column "0" - either mechanism providing limits to the forward travel of the register index rack. Register No. 9 is selected automatically each machine operation, from the full travel of the keyboard index rack, unless otherwise indexed.

This subject describes the basic method of selecting registers on the F300 - F500 Series of machines - including Carriage Controlled Index, Selecting Registers, Keyboard Column "0" Index, and Register Designation.

Carriage Controlled Indexing

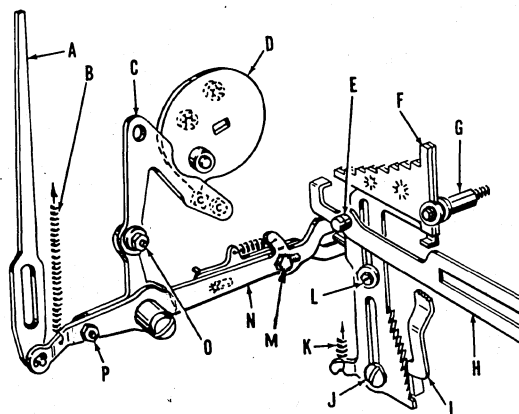


Fig. V-78

Carriage controlled indexing of register selection occurs early in the machine cycle (at approximately 5° to 8°). As sensing cam D rotates clear of the square stud in rocker arm C, spring B raises tappet A and rocks fork lever N, driving register index step plate F downward. This positions the step of plate F, corresponding with the active control pin (No. 1 through No. 8) of lane 25, in line with the formed ear of register index rack H. Register No. 9 step, the uppermost projection of index plate F, is positioned from no

control pin in lane 25.

During indexing, excessive overthrow downward of the index step plate is prevented by the contour of rocker arm C limiting against the roll in cam D and the lower finger of fork lever N being engaged under the stud of the index plate. Rebound upward of the index plate is prevented by rebound latch I engaging the notches of the lower portion of the index plate.

Selecting Registers

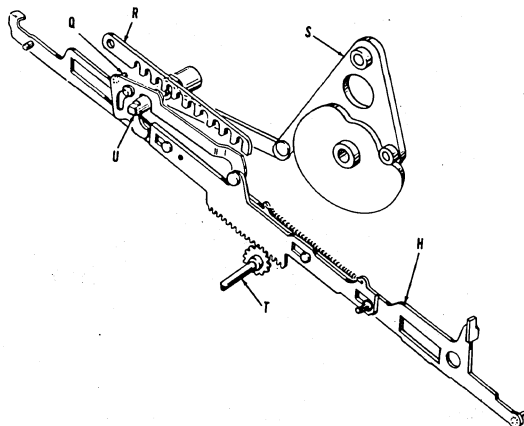


Fig. V-79

Following immediately after indexing (at approximately 10°) the register index rack H moves forward, driven from the main camshaft by driver arm S and auxiliary actuating shaft U. This forward movement of index rack H continues, thus rotating gear and shaft assembly T, un-

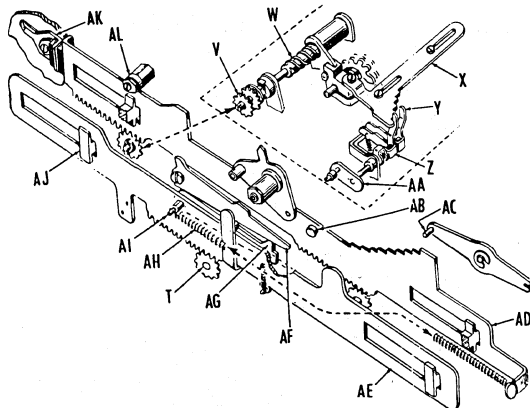


Fig. V-80

til its rear formed ear limits on the indexed step of plate F and its detent stud Q moves into the tooth space of lock plate R.

The register index rack is connected by means of shaft assembly T with register actuating rack AE, so that both racks move together. As the register actuating rack AE moves forward, its drive pawl AG engages stud AB moving the register selection rack AD forward. This in turn rotates gear V and worm shaft W to cross-slide the register pinion assembly.

Detent Pawls and Timer Slide

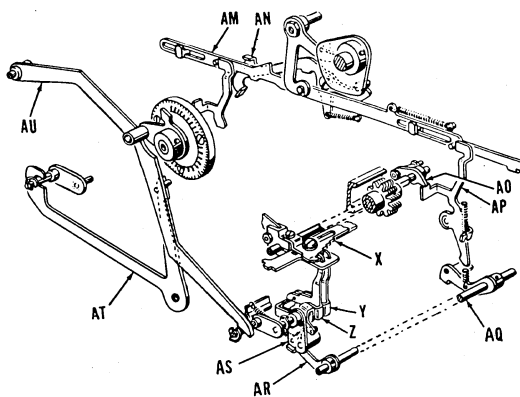


Fig. V-81

Simultaneously with the selection of an active register, the roll on the cycle indicator pointer rocks lever AU for register "B" and lever AT for register "C" which in turn indexes the release

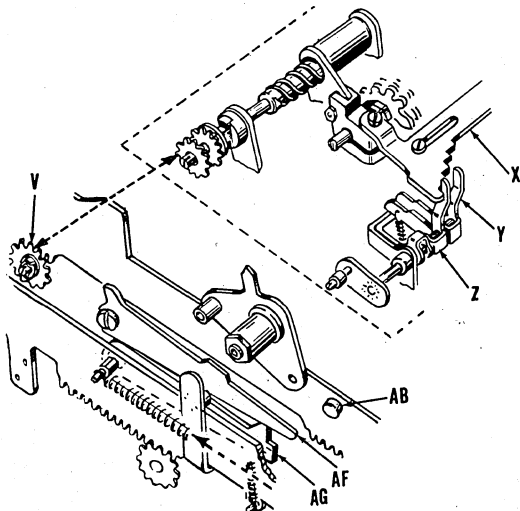


Fig. V-82

hammer assembly AS to permit detent pawl Y or Z to engage the pinion assembly step plate X. Also timer slide AM is driven rearward from the main camshaft where it is retained by latch AN until late in the machine cycle. The timer slide moved rearward permits lever AP and shaft assembly AQ to rock and latch AR to engage the step of release hammer AS. The formed ear of lever AP becomes active to engage aligning bail latch AO for relay carry timing.

As the machine cycle progresses (at approximately 65°), the roll on the cycle indicator pointer contacts lever AF to disengage drive pawl AG from stud AB. The register selection rack then settles rearward permitting the pinion assembly step plate X to limit against detent pawl Y or Z. The upper step of drive pawl AG provides a simultaneous limit for the register selection rack to prevent cramping of the active register detent pawl.

Overthrow Limits Control of Register Selection Rack

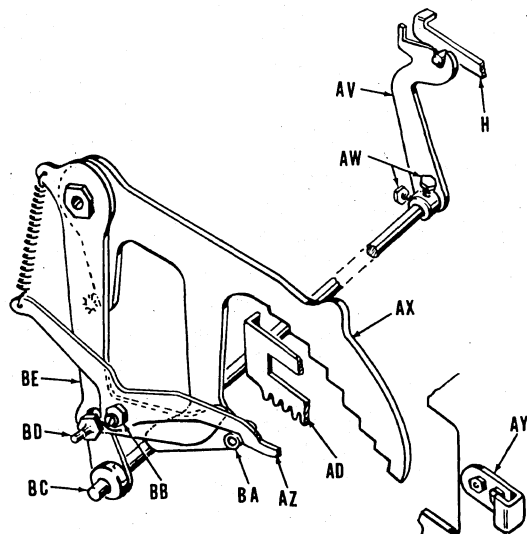


Fig. V-83

Limit rack AX, positioned from register index rack H, provides control of the register selection rack to prevent over selection of registers. Forward movement of the register index rack, through its stud and roll, moves lever AV to rock shaft assembly BC. Screw stud BD through arm BE swings overthrow limit rack AX upward to position the step, (No. 2 through No. 8) corresponding to the selected register, in line with the formed ear

of the register selection rack. Spring connected lever AZ and roll BA provide a flexible connection required when the mechanism restores to normal. Bracket AY provides an overthrow limit for the register selection rack when selecting register No. 9.

Restoring the Sensing Tappet

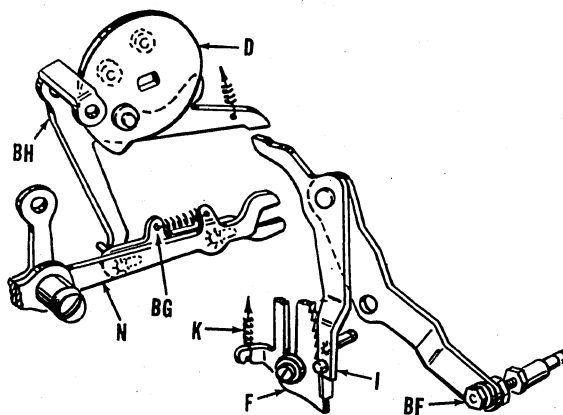


Fig. V-84

Immediately after register selection is completely indexed, sensing tappet A is restored to normal to permit carriage tabulation or return. The two rolls on the rear of cam D rock disengaging bail BH. The lower arm of bail BH moves slide BG to the left, permitting fork lever N and tappet A to be restored by rocker arm C from cam D. The horizontal arm of bail BH rocks rebound latch I clear of the notches of index step plate F, but the restoring to normal of the step plate from spring K is prevented until the register index rack is restored rearward from the main camshaft.

Restoring to Normal of Register Index Rack, Overthrow Limit Rack, Register Actuating Rack, and Register Selection Rack

Later in the machine cycle (at approximately 220°), the main camshaft through driver arm S restores register index rack H. The register index rack through shaft assembly T restores register actuating rack AE to normal position. Shaft assembly BC is also restored by the register index rack but, the restoring of overthrow limit rack AX is prevented as the register selection rack is still in selected position. The flexible connection enables lever AZ to move over roll BA. Late in the

machine cycle (at approximately 345°), timer slide latch AN is released by the main camshaft, permitting the timer slide to move forward and rock lever AP. This releases the aligning bail to mesh with the register pinions and rocks latch AR clear of release hammer AS. The release hammer and its auxiliary bail then drive the register detent pawls clear of the pinion assembly step plate, permitting the register pinion assembly and the register selection rack to restore to normal position. As the register selection rack restores from the register torsion spring assisted by spring AH, overthrow limit rack AX moves downward to normal position.

Drive Trip Interlock

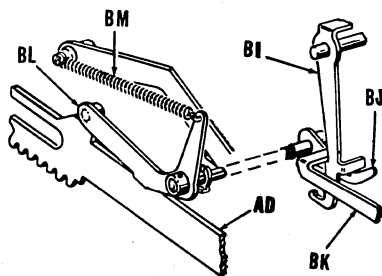


Fig. V-85

Early in the machine operation as register selection rack AD moves forward, selecting register No. 3 or a higher numbered register, its cam surface moves from under lever BL. This permits spring BM to rock the shaft assembly and swing interlock BJ upward against the formed ear of clutch release latch BI. Late in the machine cycle, when clutch release arm BK is restored upward to latching position, the inclined surface of interlock BJ assists in restoring then blocks latch BI. As the register selection rack AD restores to normal position, its cam surface rocks lever BL upward rotating the shaft and lowering interlock BJ. This permits latch BI to release the next machine operation.

Keyboard Controlled Indexing, Column "0"

In the basic construction of keyboard selection of registers, the depression of keys in column

"0" index limits to the forward travel of the register indexing rack and disable carriage controlled indexing. Register No. 9 is selected from each machine operation when no selection key is depressed. Registers No. 1 through No. 9 are selected from machine operation when indexed from keys 1-0 through 9-0. Register No. 9 is also indexed from keys 10-0, 11-0 and 12-0 as from a blank machine operation; but the designation symbol identifies the posting entry.

Keyboard Indexing

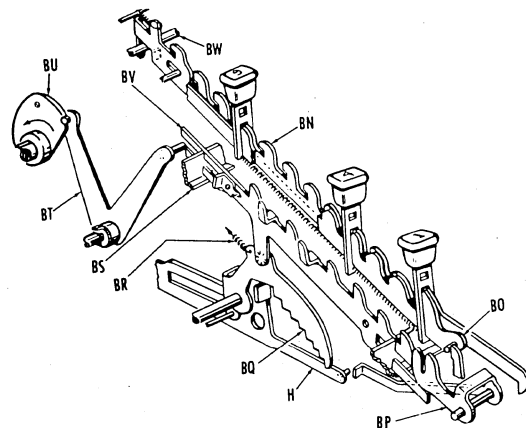


Fig. V-86

Keyboard controlled indexing of register selection occurs early in the machine cycle (at approximately 8°). As cam BU on the main camshaft rotates away from restoring bellcrank BT, spring BR rocks keyboard index rack BQ upward and moves keyboard index strip BV rearward to limit its riveted projection against guide strip BS. This positions the foremost step of rack BQ in the path of the formed ear of register index rack H to select register No. 9.

The selection of register No. 2 through No. 9 is indexed from key 2-0 through 9-0 respectively. The depressed keystone limits the rearward travel of index strip BV, thereby positioning the corresponding step of index rack BQ in the path of the formed ear of rack H.

As register No. 1 is in active position when the machine is normal, no movement of the register index rack is required to select register No. 1 on a machine operation. The depression of register selection key 1-0 rocks bail BP to position its

lower arm into the path of the stud in rack H. This blocks the forward movement of rack H, resulting in register No. 1 remaining in active position. Index strip BV moves all the way rearward as it does not have a projection for the No. 1 key-stem.

The register selection keystems are held depressed during the greater portion of the machine cycle by locking strip BN. Locking strip BN is controlled from the same shaft BW and simultaneously with the locking strips for accumulator control keys, columns "A", "B" and "C". This construction permits any key in column "0" when depressed to restore any other depressed key and provides a means of selecting a different register each machine operation.

Restoring

Keyboard index strip BV, index rack BQ and restoring bellcrank BT are restored later in the machine operation immediately following the restoring of register index rack H. The continued rotation of cam BU, through restoring bellcrank BT, moves index strip BV forward clear of the depressed keystem and, keyboard index rack BQ follows rack H in restoring to normal position. The register selection keys restore to normal near the end of the machine cycle from the main camshaft.

Keyboard Index Disables Carriage Controlled Index of Register Selection

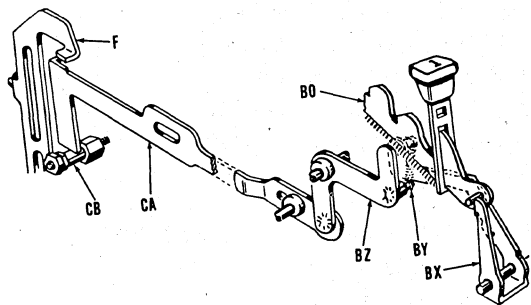


Fig. V-87

The depression of any keyboard register selection key disables carriage controlled index of register selection to provide operator control of the selected register, in the basic construction of keyboard selection of registers. Interlock CA which blocks downward movement of register index step

plate F permits the register index rack to be limited from keyboard control only.

The depression of any key in column "0" cams slide BO forward where it is retained until the keystem is restored. The stud in the forward end of slide BO rocks bail BX and, through spring connection BY and bellcrank BZ pulls link CA forward, positioning its formed ear under the projection of index step plate F.

DESIGNATION OF SELECTED REGISTERS

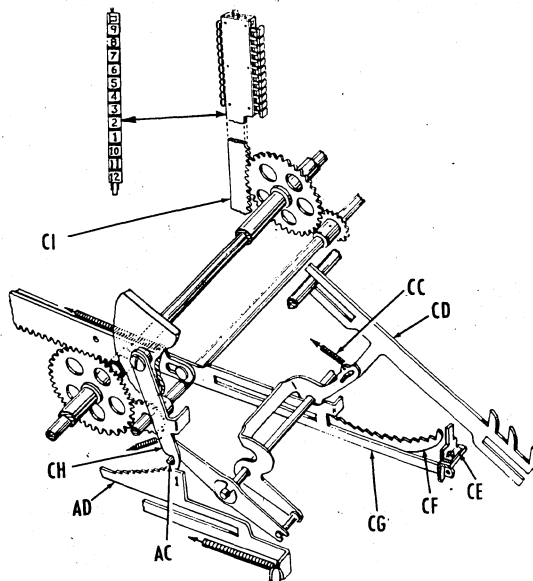


Fig. V-88

The register designation mechanism provides a means of identifying the selected register on a specific posting application. The designation symbol, usually numeral type 1 through 12, print with the accumulator symbols in printing position S-2 to the right of the carriage stop position. Symbols 1 through 9 are indexed from steps on the forward end of the register selection rack and symbols 10, 11 and 12 are indexed from keystems in column "0".

When symbols are "Arranged for Listing Distribution", as in some special machine applications, the register designation type bar is located in printing position S-3 between the accumulator "C" and accumulator "B" symbols. This is provided in the construction of the cluster gear unit and the special type bars required in printing positions S-2, S-3 and S-4.

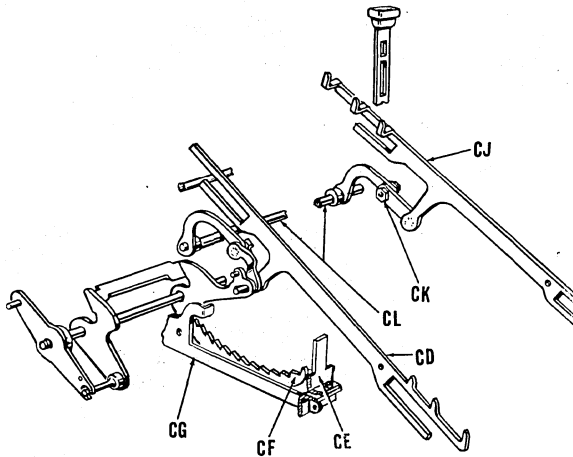


Fig. V-89

Early in the machine cycle as register selection rack AD moves forward selecting the indexed register, the step on its forward end corresponding with the selected register, positions under stud AC. Coordinated with this movement the keyboard index strip restoring shaft moves rearward. Index strip CD, between keyboard columns 11 and 12, then moves rearward and rack CF moves upward from spring CC until stud AC limits on the register selection rack. This movement positions the step of index rack CF in the path of the formed ear of rack CG but, this indexing is delayed by latch CH until after the register is selected. Latch CH, controlled from the sector bar lock mechanism, prevents interference of register designation with the settling of the register selection rack to be limited by the register detent pawl. Then rack CG, driven forward with the adding racks, raises type bar CI to printing position through the cluster gear unit.

As register No. 9 is designated from the full movement of index rack CF and index strip CD, the No. 9 type is located in the number 1 type position but prints only with listed amounts or accumulator symbols. Similarly, the selection of registers No. 8 through No. 1 position corresponding steps of index rack CF resulting in a reverse type arrangement with the No. 1 type located in the ninth type position.

The depression of keys 10-0, 11-0 and 12-0 provide limits to the rearward travel of symbol index strip CJ in column "0". Through shaft assembly CL, index rack CF is limited earlier than from

the register selection rack. Keystem 12-0 positions symbol index rack CF disabled, permitting the formed ear of rack CG to move over the top of rack CF and limit against projection CE. Keystems 11-0 and 10-0 index the last step and the next to last step, respectively, of rack CF in the path of the formed ear of rack CG. Designation symbols are arranged in the type magazine accordingly with number 12 in the lowest position. Index strip CD restores the register designation mechanism to normal simultaneously with the index racks for the amount section.

Tests and Adjustments

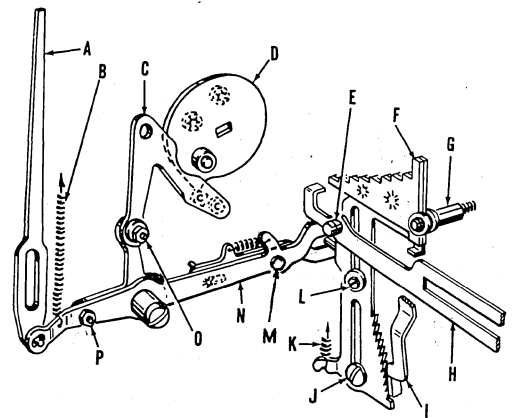


Fig. V-90

NOTE: Tests for Sensimatic Control Unit, Sensing Camshaft and Sensing Bellcranks must be made prior to the following.

A10-1 With step plate F indexed to register No. 1 position and the machine rotated to 60° , manually hold index rack H rearward to place stud Q against the rear edge of the No. 1 tooth space in lock plate R. There should be .003" to .005" clearance between the ear of rack H and step plate F when the plate is held against the roll on post G.

TO ADJUST, disconnect the arm from roll E in rack H, loosen screw L, and starting with the high side up, turn eccentric post G.

REASON: To position step plate F in relation to lock plate R.

A10-2 Step plate F should be free to drop to all positions when its front edge is contacting the roll on post G.

TO ADJUST, with the machine normal, manually raise and hold step plate F to the end of its slot and to the front, and tighten screw L.

REASON: To ensure free movement of step plate F.

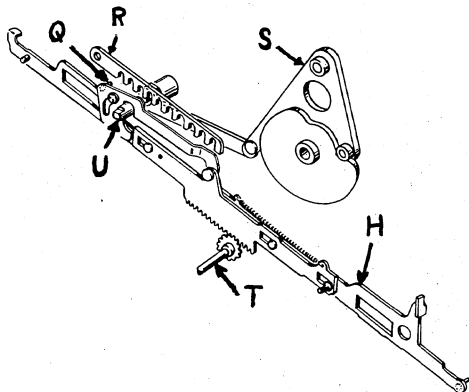


Fig. V-91

A10-3 With the machine normal, the rear formed ear of rack H should be level with the top of the projection of arm AV Fig. V-98.

TO ADJUST, weave the rear portion of rack H up or down.

REASON: To establish the basic position of rack H.

A10-3A With the machine normal there should be no more than .003" clearance of the stud in step plate F in the fork of lever N.

TO ADJUST, turn eccentric M.

NOTE: Older machines do not contain eccentric screw M.

REASON: To maintain the normal position of step plate F.

A10-4 With the carriage controls normalized and the machine operated to 15°, the rear formed ear of rack H should have .025" to .030" clearance under step plate F.

TO ADJUST, turn eccentric O.

REASON: To establish the normal position of step plate F.

K7-8 With the machine at normal, depress the No. 8 register selection key. Depress the motor bar and manually cycle the machine until the lip of rack H is in the No. 8 step of rack BQ. The lip of rack H should clear the No. 7 step of rack BQ by no less than .010" and have no less than 2/3 hold on the No. 8 step of rack BQ. Repeat the above test for keystems 2, 3, 4, 5, 6 and 7.

TO ADJUST, weave lower projection of the key-stems forward or rearward as required.

REASON: To ensure correct indexing of the register selection rack bar from the keyboard.

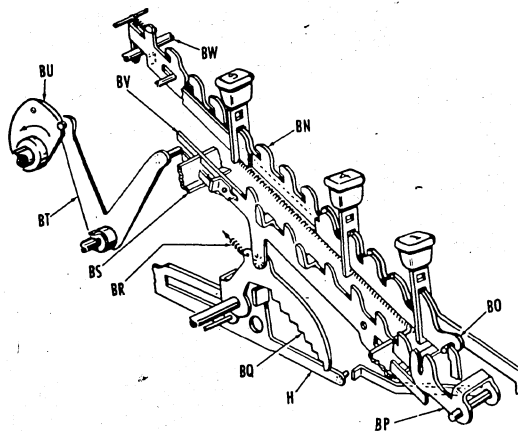


Fig. V-92

K7-9 Manually cycle the machine until the projection on index strip BV limits on guide comb BS and check for:

A. Lip of register selection rack H to have no less than a 2/3 hold on the No. 9 step of index rack BQ. Continue cycling the machine until the stud in restoring arm BT contacts index strip BV.

B. The register selection rack should clear the No. 8 step of the index rack by no less than .010" TO ADJUST,

A. Bend projection on index strip BV.

B. Weave stud of restoring arm BT for earlier or later contact of index strip BV.

REASON: To ensure the correct indexing of the register selection rack bar from the No. 9 key-stem.

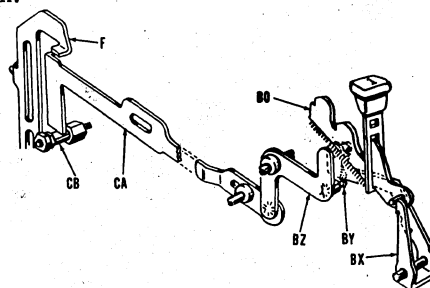


Fig. V-93

A10-5 With the machine normal and any register selection key depressed,

A. Interlock slide CA should have .008" to .010" clearance under step plate F.

B. Interlock slide CA should have approximately 1/2 hold on the ear of step plate F.

TO ADJUST,

A. Weave the rear portion of slide CA up or down.

B. Weave bail BX.

REASON: To ensure blocking step plate F when a register selection key is depressed.

A10-6 With the machine normal and any register selection key depressed, slide CA should have .003" to .005" clearance over eccentric CB.

TO ADJUST, turn eccentric CB.

REASON: To ensure the free movement and proper support of slide CA.

A10-7 With the carriage controls active and a register selection key depressed, cycle the machine to 15°. The rear formed ear of rack H should clear under step plate F by not less than .010".

TO ADJUST, recheck A10-4, -5 and -6.

REASON: To ensure keyboard indexing taking precedence over carriage controlled indexing of a selected register.

A10-8 With the No. 1 register selection key normal, the front stud on rack H should clear under the ear of bail BP. With the No. 1 register selection key depressed, the stud should be blocked by the ear of bail BP.

TO ADJUST, weave bail BP.

REASON: To ensure selecting register No. 1 from keyboard control.

A10-9 With a No. 1 register selection key depressed cycle the machine to approximately 60°. Manually hold index rack H rearward to place stud against the rear edge of the No. 1 tooth space of the lock plate. There should be .003" to .005" clearance between the formed ear on bail BP and the stud in rack H.

TO ADJUST, bend the formed ear of BP as required.

REASON: To ensure free entry of the stud into the tooth space of the lock plate.

A10-9A With No. 7 register selection key depressed cycle machine to approximately 60°. Manually hold index rack H rearward to place stud against rear edge of the No. 7 tooth space of the lock plate. There should be .003" to

.005" clearance between the ear on rack H and the No. 7 step on rack BQ.

TO ADJUST, bend index rack H to locate its formed ear as required.

NOTE: Do not bend the ear.

REASON: To ensure free entry of the stud into the space of the lock plate.

A10-10 With the machine operated manually, cam D should release the square stud on lever C from 5° to 8° rotation of the main camshaft.

TO ADJUST, loosen the lock nuts on the rear of the sensing camshaft, and reposition cam D.

REASON: To ensure against premature or late release of lever C.

A10-11 With step plate F positioned from a No. 3 pin in lane 25, the rear formed ear of rack H should clear the No. 2 step by .030" to .035".

TO ADJUST, turn eccentric P.

REASON: To ensure selection of the correct register when indexed from control pins in lane 25.

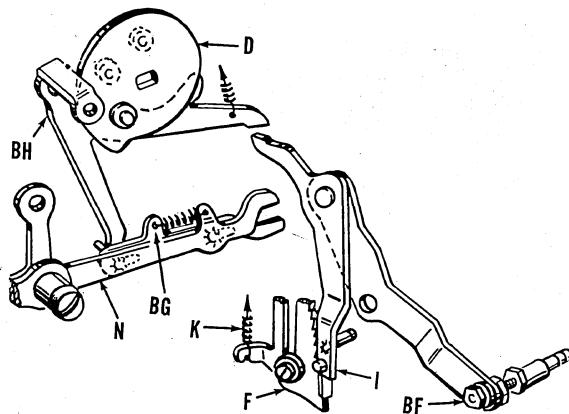


Fig. V-94

A10-12 With step plate F positioned from a No. 3 pin in lane 25 and manually held upward against rebound latch I, the formed ear of rack H should clear the No. 2 step of step plate F by .005" to .010".

TO ADJUST, loosen nut BF and reposition latch I.

REASON: To limit the rebound of step plate F.

A10-12A With step plate F positioned without a control pin in lane 25, and plate F held upward against rebound latch I the formed ear of rack H should clear step No. 8 of plate F by .005" to .010".

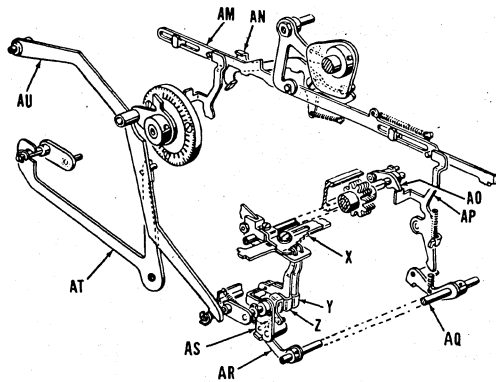


Fig. V-95

TO ADJUST, recheck adjustment A10-12.

REASON: To limit rebound of step plate F.

A10-13 With the machine manually operated until arm AU receives maximum throw, register hammer AS should have .010" to .030" latching lead over latch AR.

TO ADJUST, weave arm AU for register "B" and arm AT for register "C".

REASON: To allow detents Y and Z to become active.

A10-14 Arm BH should move rebound latch I forward to allow step plate F to restore to normal near the end of the machine cycle (approximately 290°).

TO ADJUST, weave the upper arm of latch I.

REASON: To ensure step plate F restoring to normal.

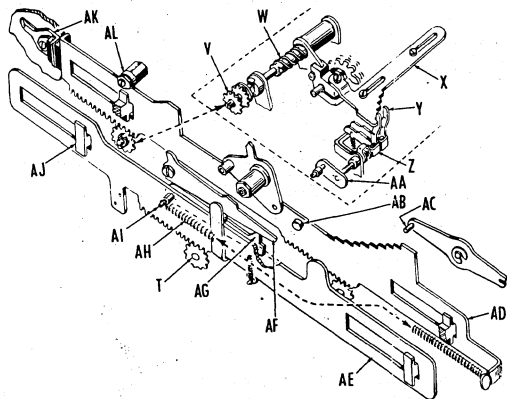


Fig. V-96

A10-15 With the machine normal, remove the retaining clip and lower stud AC to contact selection rack AD. The rear edge of stud AC

should be in line with the rear edge of the No. 1 step on racks AD.

TO ADJUST, turn eccentric in limit AK.

NOTE: On machines of nine register construction which do not contain part AC, there should be .093" clearance between post AJ and the front of the slot in slide AD.

REASON: To establish the normal position of selection rack AD.

A10-16 There should be .001" to .003" clearance between hold-down roll AL and rack AD in all selected positions.

TO ADJUST, turn eccentric in AL.

REASON: To limit the upward thrust of rack AD ensuring uniform hold on the steps of overthrow limit AX.

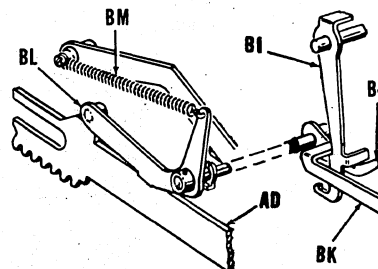


Fig. V-97

A10-17 With the machine normal and clutch release latch BI in normal position, manually raise limit AX and move rack AD forward until the projection on the rack is clear of roll in BL. With BL limiting on the horizontal surface of rack AD, there should be no more than .050" clearance between the formed ear of latch BI and the vertical surface of hesitator BJ.

TO ADJUST, weave the formed ear of latch BI.

REASON: To provide additional time between machine operations when selecting registers 3 through 9.

A10-18 NOTE: With register No. 4 or higher selected, cycle the machine to 340°. With roll in BL limiting on rack AD, interlock BJ should have a full hold on the formed ear of latch BI but should not bind against the underside of the formed ear, and latch BI should be free to restore when manually rocked forward. This is to ensure providing additional time between machine operations when selecting registers 3 through 9.

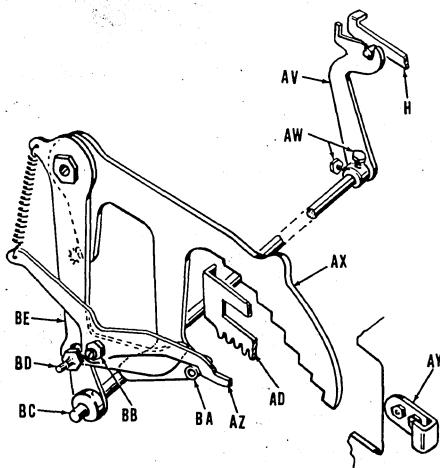


Fig. V-98

A10-19 With the machine normal there should be .120" to .130" clearance between the front of guide post AJ and the front end of the slot in drive rack AE.

TO ADJUST, with spring AH hooked between eccentric AI and post BD, insert a .093" gauge (shaft 407015 may be used) in front of post AJ and remesh gears T to this setting with the punch mark on the gear toward the top. With spring AH hooked in its normal position, there will be .120" to .130" as indicated.

REASON: To position drive rack AE at normal within range of eccentric adjustment for pawl AG.

A10-20 With selection rack AD normal and release hammer AS rocked manually, outer detent Z should move rearward with slight clearance of the No. 1 step on step plate X. When slight pressure is applied to the right on plate X, detent Z should "hang up".

TO ADJUST, remesh gear V with rack AD.

NOTE: Manually operate the machine to select register No. 9. If, after making the above adjustment, the register is not retained in No. 9 position by the detent, return the machine to normal and relocate gear V by turning it counter-clockwise one tooth at a time.

REASON: To ensure positive indexing of the selected register.

A10-21 With spring AH hooked between post BD and eccentric AI to remove backlash, and the machine manually cycled to select register No. 3, the ear on selection rack AD should move to within .005" of the No. 3 step of overthrow limit AX before drive pawl AG is disengaged (approximately 65°).

TO ADJUST, starting with the high side down, turn eccentric AI to position drive pawl AG.

REASON: To drive rack AD to its correct position.

A10-22 With spring AH hooked between post BD and eccentric AI to remove backlash and the machine manually cycled to select register No. 9, the front limit ear on rack AD should move to within .005" of bracket AY before pawl AG is disengaged (approximately 65°).

TO ADJUST, weave bracket AY.

REASON: To prevent overthrow of rack AD when selecting register No. 9.

A10-23 With the machine cycled manually to select register No. 8, the No. 7 step of overthrow limit AX should clear the formed ear of rack AD by .005" to .010".

TO ADJUST, locate eccentric BD with its high side up, loosen set screws AW in arm AV and reposition shaft BC. If necessary, refine the adjustment with eccentric BD.

REASON: To secure correct positioning of limit AX from index rack H.

A10-24 With the machine normal, roll BA on limit AX should seat in the pocket of detent lever AZ with slight pressure against the inclined surface, and have .003" to .005" clearance between the top of roll BA and lever AZ.

TO ADJUST, turn eccentric BB.

REASON: To ensure positive normal positioning of overthrow limit AX.

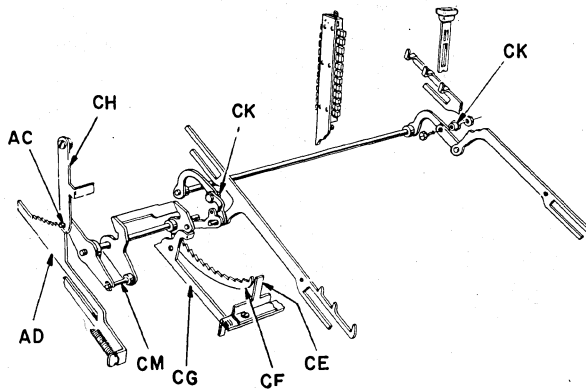


Fig. V-99

PR5-1 With a register selection key depressed and the machine cycled until rack AD has settled rearward after overthrow, cycle the machine one more degree. Latch CH should release stud AC. TO ADJUST, weave the ear of latch CH. REASON: To ensure positioning stud AC on the proper step of rack AD.

PR5-2 With register No. 1 selected, manually cycle the machine. The ear of rack CG should have no less than .010" clearance over the No. 2 step of index rack CF and have no less than 2/3 hold on the No. 1 step. TO ADJUST, tip arm of index rack CF to locate stud CM as required.

NOTE: Perform above test for registers 2 thru 9. REASON: To ensure correct designation of the selected register.

PR5-3 With register selection key No. 10 or No. 11 depressed, manually cycle the machine. The ear of rack CG should have no less than .010" clearance over the previous step of index rack CF and no less than a 2/3 hold on the indexed step.

TO ADJUST, turn eccentrics CK. If necessary, bend the keystem for individual adjustment.

REASON: To ensure correct symbol designation from register selection keys No. 10 and No. 11.

PR5-4 With register selection key No. 12 depressed, manually cycle the machine. The ear of rack CG should have no less than .010" clearance over the last step of index rack CF.

TO ADJUST, bend the keystem for the No. 12 key.

REASON: To ensure correct symbol designation from register selection key No. 12.

PR5-5 With register selection key No. 12 depressed, manually cycle the machine. With the formed ear of rack CG limiting against limit plate CE, the lock stud on rack CG should be free in the tooth space of its lock plate.

TO ADJUST, bend the projection of CE.

REASON: To ensure free entry of the lock stud into the tooth space of the lock plate.

Burroughs
SERIES F25 - F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F700 and F5000)

INSTRUCTION BOOK

Section VI



MECHANISMS AND ADJUSTMENTS
CARRIAGE

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CARRIAGE

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CARRIAGE MECHANISMS

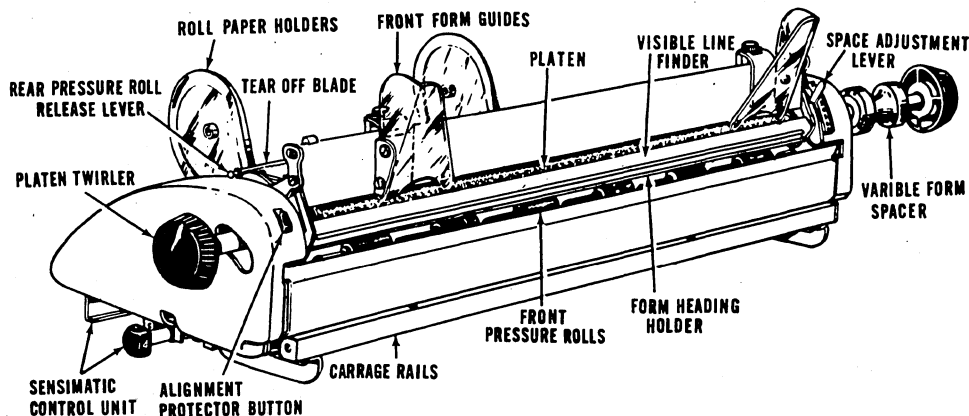


Fig. VI-1

The carriage used on Series F machines is of the front feed type and is automatically moved to the right or left to position the posting column of the forms into printing position. Carriages with either 15", 18" or 22" platens may be used on the Sensimatic.

To assist in form handling, the forms are guided in the front by plastic form guides and in the rear by form chutes. Both the front form guides and rear form chutes are adjustable to accommodate forms of different widths; and different styles of guides and chutes are available for handling different forms. The forms are normally aligned to the last posting line with the visible line finder while the carriage is open. Depression of the pressure roll release button closes the front pressure rolls, if desired, to hold the forms in alignment. If all forms are to be inserted to a common writing line, adjustable limits are provided on the rear form chutes.

The form heading holder is used to indicate the carriage printing position to the operator; and a red mark on the top of the ribbon cover indicates the right side of the printing position.

Adjustable roll paper holders mounted on the rear carriage cover accommodate the roll journals and listing tapes which are used to record the postings made to statements and ledgers. A pressure roll release lever is provided to release the rear pressure rolls when inserting the roll journals around the platen.

The forms are spaced up during the latter

part of the machine cycle when indexed from carriage controls, or they may be spaced manually by turning the platen twirlers. A space control lever is provided to index space from 0" to 1" in multiples of 1/6". The variable spacing mechanism on the right end of the platen is used to space the forms a fraction of a full space.

The carriage is closed automatically at the beginning of each machine cycle and may be indexed to open from carriage controls. The carriage may also be manually indexed to open and close by depressing the carriage opening and closing key.

Carriage movement (tabulation and return) is indexed automatically from machine operation, carriage controls and motor bars to move the carriage laterally on roller bearings in the carriage raceways. Carriage movement may also be indexed manually from depression of the tabulation and return control keys.

The carriage controls which automatically index the carriage and other machine functions are contained in the Sensimatic Control Unit (panel) on the rear of the carriage. The Sensimatic Control Unit also contains the stops which determine the carriage position and disks to control carriage movement.

This subject covers the construction, operation, and adjustment of the basic carriage mechanisms, such as, spacing the forms, opening and closing the carriage, tabulating and returning the carriage and automatic machine and carriage functions indexed by the Sensimatic Control Unit.

CARRIAGE CONSTRUCTION AND OPERATION

Inner and Outer Carriage Sections

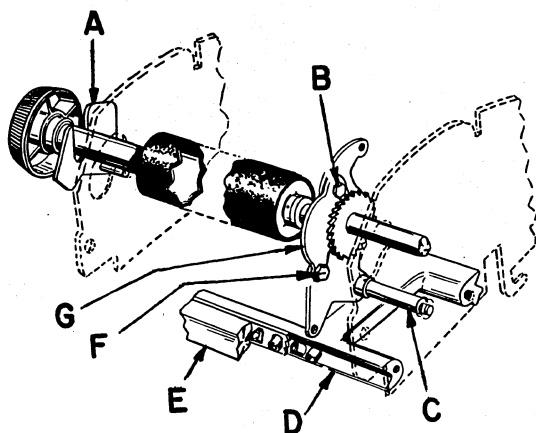


Fig. VI-2

The Series F carriage, which is of the front feed type, is made up of two sections - the inner carriage section and the outer carriage section. The complete carriage travels on roller bearings which are positioned as illustrated in retaining strips between milled raceways D and E. Outer raceways E, which are stationary, are secured to the machine sideframes and inner raceways D are part of the outer carriage sideframes. The inner carriage section is pivoted between these sideframes on shaft C, thus rocking the inner carriage forward or rearward, closes or opens the carriage to permit printing and removal and insertion of forms. The platen is supported between the sideframes of the inner carriage section.

When the inner carriage is rocked to its open or closed position, safety shutter A is positioned

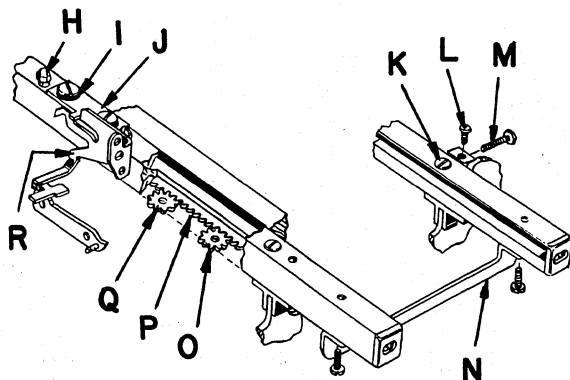


Fig. VI-3

by the platen shaft to close the slot in the carriage left sideframe cover. This prevents possible injury to operators who may accidentally get their fingers between the platen shaft and the end of the slot in the cover.

The carriage is driven to the left during tabulation and to the right during return by gears O and Q, through rack P which is fastened to the inner carriage raceway.

When the carriage is moved to its extreme right or left end position, detents R limit and hold the carriage in position through plate J and rubber grommets I. The lower arms of the detents depress their respective stop bumpers and release the tabulation or return clutch and, by holding the stop bumpers depressed, the detents prevent the machine from operating by blocking the drive trip.

Platen Assembly

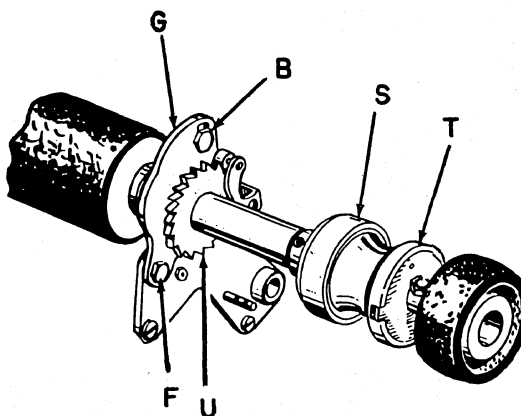


Fig. VI-4

The platen is supported on either end by adjustable plates G which are secured to the inner carriage sideframes with adjusting screws. The platen shaft extends through the slots in the outer carriage sideframes and a variable spacing mechanism is assembled to the right end of the shaft.

The variable spacing mechanism allows the operator to manually space the forms up or down a fraction of the normal $1/6$ " space. To space the forms a fraction of the normal space, the operator disengages variable space clutch T by pulling it out from clutch drum S. With the clutch disengaged the platen may be rotated the

desired amount and when the clutch is released it re-engages the clutch drum and the platen is held in position by the detent roll on ratchet wheel U.

The normal 1/6" spacing of the platen is accomplished through the variable spacing clutch members S and T. The clutch members and form spacing ratchet wheel U all turn freely on the platen shaft. Clutch T is keyed to the platen twirler which is tightened on the platen shaft with a set screw, thus, when the ratchet is turned by the space pawl the platen is rotated through the variable spacing clutch.

Pressure Rolls

The pressure rolls hold the posting forms and journal rolls against the platen so that when the platen is spaced up the forms will also space. Three sets of pressure rolls are used - the upper pressure rolls and the lower front and rear pressure rolls.

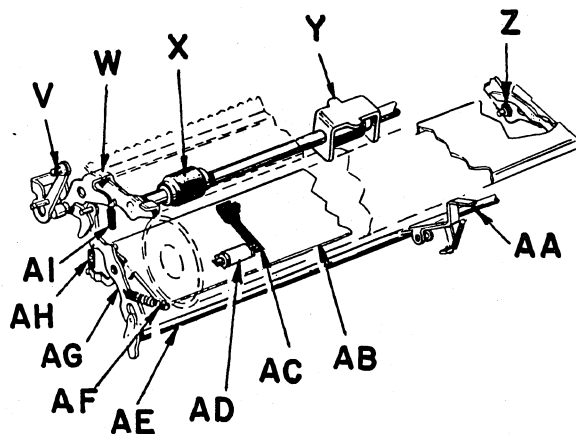


Fig. VI-5

Upper pressure rolls X and lower rear pressure rolls AD hold the journal rolls and listing tapes around the platen to ensure proper spacing of these forms. The upper pressure rolls are mounted on a shaft under the paper tear off blade and may be moved to any position on the shaft to provide correct distribution of pressure, thus insuring even feeding of the various forms around the platen. The two center upper pressure rolls are mounted inside brackets Y which keep the pressure rolls from contacting the tear off blade.

The upper pressure roll shaft and the tear off

blade are mounted on brackets W which pivot on the inner carriage sideframes. Springs AI hold the pressure rolls against the platen. With the carriage open and the paper table tilted back, the upper pressure rolls are raised up to clear the platen through the camming action of the arms of the paper table on the rolls of brackets W.

Lower rear pressure rolls AD are assembled on pan AB with individual anchor springs AC. Pan AB is pivoted between the inner carriage sideframes and holds the pressure rolls against the platen through springs AF. With the carriage open, the pressure rolls may be released by moving lever V rearward which cams arm AG forward. With arm AG rocked forward, it lowers the pressure roll pan assembly through spring AH. Rocking of arm AG also releases paper fingers AA through shaft AE. The paper fingers hold front inserted posting forms in position until the carriage closes and the front pressure rolls are active.

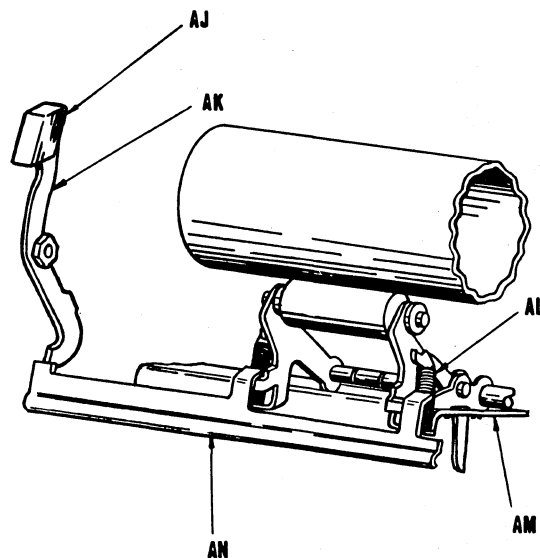


Fig. VI-6

The front pressure rolls, which pivot on shafts assembled to inner carriage tie strip AM, are mounted independently and are held against the platen by springs AL. When the carriage is closed, the front pressure rolls hold the posting forms in place and supply the proper tension on the forms to ensure proper spacing when the platen is spaced up. When the carriage is opened, the pressure rolls are held away from the platen

by the hooked projections of bail AN so that the forms may be removed and others inserted. If desired, the front pressure rolls may be closed while the carriage is open by depressing alignment protector button AJ. Depression of the alignment protector button rocks bail AN forward, through lever AK, thus releasing the pressure rolls so they are held against the platen under spring tension.

Form Handling

In addition to the plastic front form guides, which are mounted on the paper table, several other devices are used on the carriage to speed up the operation of inserting forms and aligning them to the printing line

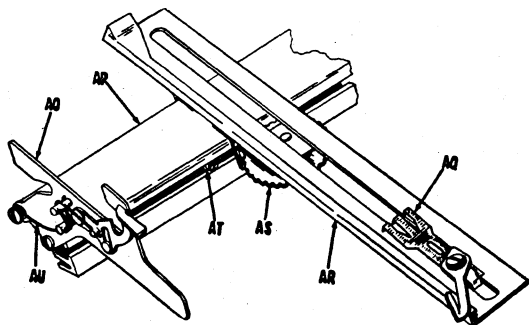


Fig. VI-7

The rear form chutes, which are mounted on the rear of the carriage and supported by studs in the outer carriage sideframes, receive the front inserted forms and guide them to prevent interference with mechanisms behind the platen. The chutes may be moved to any position on table AP by turning knurled wheel AS which loosens the chute locking screw. Limit stops AT may be locked in various positions to serve as a limit for chutes for different posting forms and then moving them back to their original position against the limit screws.

To limit the posting forms to a common predetermined printing line, limits AQ may be moved the length of the chute and locked in any position.

To ensure easy removal of front inserted forms, rear form chute latches AO are flexible and spring AU will yield and permit the front end of the chutes to raise if the lower edges of the

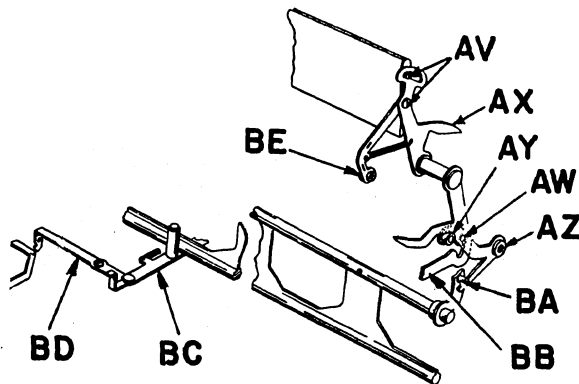


Fig. VI-8

forms are caught between the chutes and the pressure roll pan as the carriage opens.

The paper table, which carries the plastic front form guides, and the visible line finder, which is used to align the forms to the printing line, are assembled to brackets AX which pivot on the outer carriage sideframes. When the carriage is opened or closed hooks BB on the carriage opening and closing shaft rock the paper table and visible line finder into position through the rolls on the lower portion of brackets AX. With the carriage open, hooks BB are moved away from the rolls on brackets AX to permit the paper table to be tilted back. When the paper table is tilted rearward, stud AY rocks bellcrank AZ which moves the spacing bail rearward allowing slide BC to move rearward. The rearward movement of slide BC rocks interlock BD into active position to prevent the machine from operating by blocking the drive trip. The machine operation is prevented when a motor bar is accidentally indexed when the operator has the paper table tilted rearward to adjust or insert forms.

Tests and Adjustments

C12-1 The inner carriage shaft assembly C should have from .002" to .010" end play between carriage side frames.

TO ADJUST, insert shims between carriage shaft assembly C and carriage sideframe.

REASON: To permit accurate, vertical alignment of the type impression.

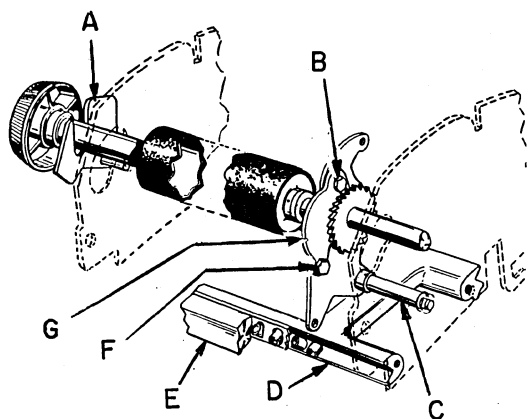


Fig. VI-9

C12-2 The platen should be free to turn and have no more than .012" side play between end plates G.

TO ADJUST, use a space washer between end plate G, on the right end of the platen and the clip on the platen shaft.

REASON: To aid in maintaining the vertical alignment of the type impressions.

C12-3 Split and normal platen should be free to turn and:

A. Platens should have no more than .012" side play between end plates G.

B. The clearance between the platens should not exceed .031".

TO ADJUST,

A. Use space washer between end plates G and the clips on the platen shaft as required.

B. Use space washers between platens and end plates G.

REASON: To aid in maintaining the vertical alignment of the type impressions.

C12-14 With a full keyboard indexed, type impressions should be uniformly dense at the top and bottom, in the center, and end position of the platen.

TO ADJUST, loosen screws B and F. Raise or lower the platen as required and tighten screws F. Starting with the dot on the eccentric nut of screw B at 12 o'clock, adjust the eccentrics as required for correct horizontal alignment of the platen. Tighten screws B to lock the eccentric nuts.

REASON: To establish the correct height of the platen in relation to the type.

C12-22 With all fives indexed and the machine operated to 150°, there should be .137" to .142" clearance between the platen and the face of the type at both ends of the platen.

TO ADJUST, with screws F just snug enough to retain platen height, adjust eccentric nut on screw B as required and tighten screws B and F.

NOTE: Recheck test C12-14.

REASON: To provide the correct relationship between the platen, type and hammer section.

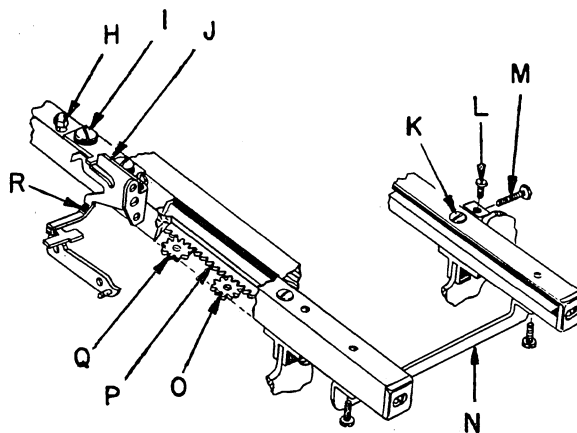


Fig. VI-10

C12-17 With the machine at normal, the carriage should move freely with no more than .003" play between the raceways and the bearings.

TO ADJUST,

A. Loosen the screws holding carriage rack P.

B. Loosen the screws in tie strips N.

C. Loosen screws K in the front carriage rail just enough for the rail to be moved.

D. Loosen lock screws L.

E. With the carriage in a central position, move the front rail rearward snug against the bearings and turn screws M to within .003" clearance (use feeler gauge) of the rail and tighten lock screws L.

F. Move the front rail forward firmly against screws M and tighten screws K.

G. Tighten the screws in tie strips N.

H. Position the carriage rack for .002" to .005" play between the rack and carriage drive gears Q and O in the center and end positions. Tighten screws holding the carriage rack.

REASON: To maintain the carriage in correct alignment with its related sections.

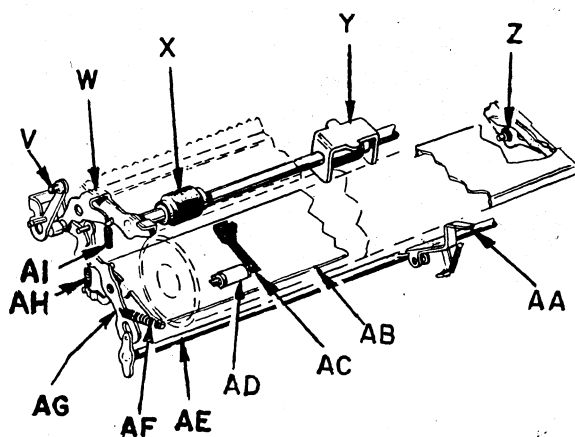


Fig. VI-11

C12-4 With the carriage in its closed position there should be .025" to .050" clearance between pressure roll plate AB and the platen.
TO ADJUST, turn eccentric stud Z as required.
REASON: To provide clearance for the feeding of the forms.

C12-10 With the carriage in the open position, the lower arm of pressure roll release lever V should have a full hold on the stud in lever AG.
TO ADJUST, bend the lower arm of pressure roll release lever V.
REASON: To permit insertion and alignment of the journal paper.

C12-6 Pressure rolls X on the upper pressure roll assembly should contact the platen with equal tension.
TO ADJUST, weave brackets W and support brackets Y.
REASON: To ensure uniform feeding of the journal sheets.

C12-24 With the carriage open, paper fingers AA should contact the platen evenly, and have at least .005" clearance under the lower edge of the visible line finder.
TO ADJUST, bend paper fingers AA as required.
REASON: To retain the forms with the carriage in its open position.

C12-5 With the carriage in its open position, rollers AW on upper paper table supports should have a full hold without bind on hook arms BB.
TO ADJUST, bend hook arms BB.
REASON: To ensure positioning the upper paper table in opening and closing operations.

C12-11 With the carriage open and the arms of brackets AX limiting on the square studs of the

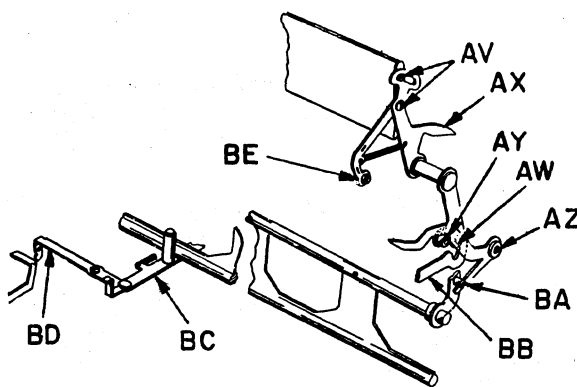


Fig. VI-12

outer carriage sideframes, eccentric rolls BE should limit evenly on the plates of the inner carriage sideframe.

TO ADJUST, turn eccentrics BE as required.
REASON: To establish clearance between the visible line finder and the platen.

C12-23 With the carriage open and the forms inserted so that the bottom edge of the printed amount is aligned to the top edge of the visible line finder, operate the machine. The machine should print 1/6" below the printed amount that was aligned with the line finder.
TO ADJUST, loosen screws AV and raise or lower the visible line finder as required.
REASON: To ensure accurate spacing of front inserted forms.

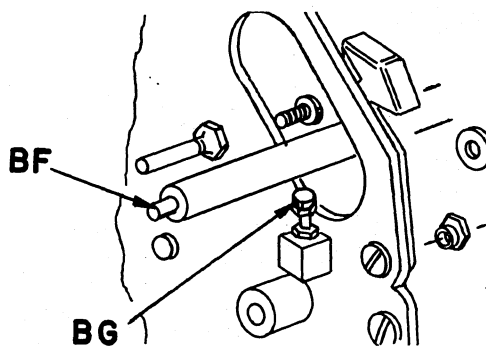


Fig. VI-13

C12-28 With the carriage closed and centrally located on the carriage rails, apply slight pressure rearward to the center of the platen to remove play. There should be .003" clearance between limit pads BG and the highest position of spacer sleeves BF, determined by rotating the platen shaft.

TO ADJUST, raise or lower pads BG as required
 REASON: To provide an overthrow limit for the platen in the closed position to improve the alignment of the print.

SENSIMATIC CONTROL UNIT

The Sensimatic Control Unit (Panel) contains the stops for the various carriage positions, the discs that control selective carriage tabulation and return and the control pins for the various automatic machines functions.

The Sensimatic Control Unit is divided into 25 lanes of control that are numbered progressively, beginning with "lane 1" at the front of the unit. The discs that control selective tabulation and return, are effective in lanes 1 through 5 and the control pins, that control various machine functions, are effective in lanes 6 through 25.

The basic automatic machine functions that are controlled by the 25 lanes of control are as follows:

<u>Lane of Control</u>	<u>Function</u>
1	Selective Tabulation
2	Selective Return
3	Selective Tabulation
4	Selective Tabulation
5	Selective Return
6	Accumulator "A" Total
7	Accumulator "A" Subtract or Non-Add
8	Accumulator "A" Subtotal
9	Accumulator "B" Subtotal
10	Accumulator "B" Total
11	Accumulator "B" Subtract or Non-Add
12	Red Ribbon Shift
13	Form Spacing
14	Carriage Opening
15	Disable Space or Disable Space and Return
16	Net Accumulation
17	Accumulator "C" Subtract or Non-Add

18	Repeat of Auxiliary Motor Bars
19	Red Ribbon Shift Repeat
20	Accumulator "C" Total
21	Repeat of Machine Operation or Repeat of Machine Operation and Keyboard
22	9 Position Printing Control
23	Accumulator "C" Subtotal
24	Counter Dials and/or Automatic Count
25	Register Selection

Automatic machine functions are indexed when rotation of the sensing camshaft, through its cams, raises various sensing levers and tappets. When tappets touch or "sense" control pins in the Sensimatic Control Unit, their upward movement is limited. However, continued rotation of the sensing camshaft causes the opposite ends of the sensing levers to rise and impart movement to the various bellcranks that index the automatic machine functions through their respective linkages.

The cams on the sensing camshaft are designed and positioned to index the various carriage controlled functions at the proper relative time during the machine cycle. Latch plates ensure that the linkages are held indexed until the function has been completed.

The Sensimatic Control Unit is designed to provide four complete accounting applications. It is located on the rear of the carriage and contains stops BM for the various carriage positions, disks BL in lanes 1 through 5 for selective carriage tabulation and return, and control pins BH in lanes 6 through 25 for indexing automatic machine functions.

The stop and disk projections extending downward from the control unit, and the control pins in alignment with the stop projections, constitute the controls for one accounting application. These active controls are referred to as a schedule. The number on job selector knob BQ facing the operator is the number of the schedule that is in active position. The job selector knob may be turned from a lower schedule to select the next higher schedule but in schedule four, it must be turned backwards to select a lower one.

Selecting a different schedule, by turning

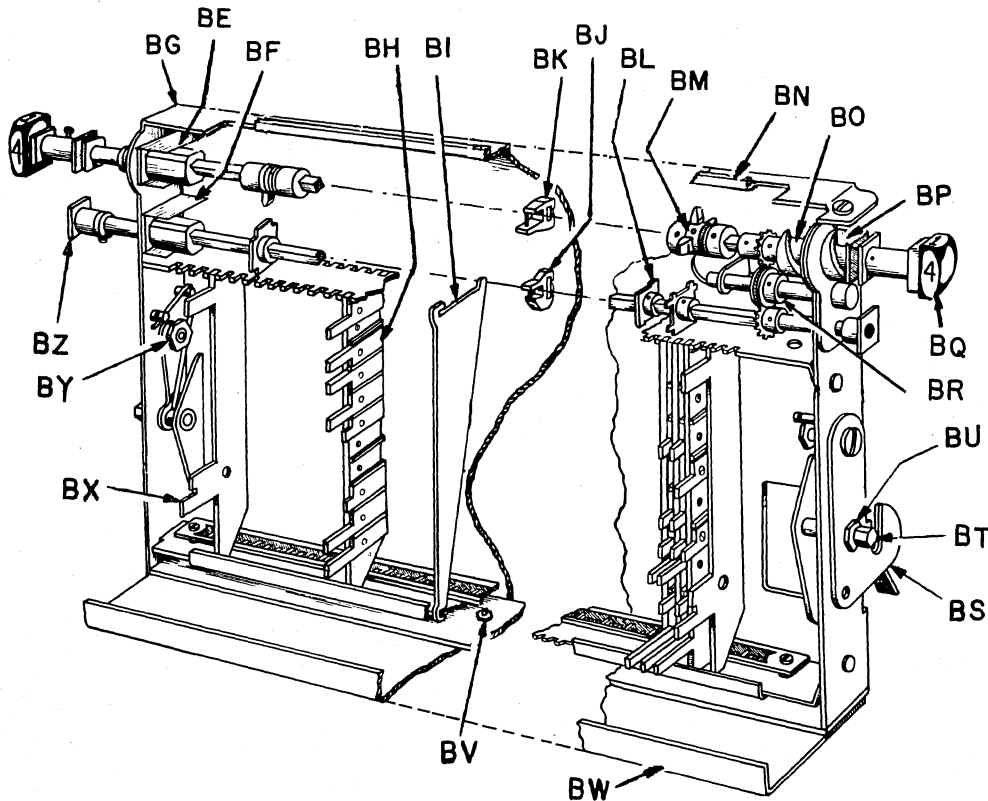


Fig. VI-14

the job selector knob, rotates the stop shaft to provide a different group of stop projections in active position; and through intermediate gear BR, rotates the disk shaft to provide a different group of disk projections in active position. Rotation of the stop shaft one schedule causes spiral BO, through eccentric BP, to move the control unit $\frac{1}{8}$ of an inch to the right or left on the stop shaft, depending on which direction the stop shaft is rotated, aligning a different group of control pins with the active stops. Flat springs BE and BF retain the stop shaft and disk shaft in selected position.

Tie strips BI provide support to hold the magazines in the control unit more securely. Braces BK and BJ support the stop shaft and disk shaft to hold the stops and disks at the proper height in the control unit. Third rail BW provides support for the control unit in the carriage. Reference plates BX are used to provide reference points when adjusting the control unit.

Stop Limitations

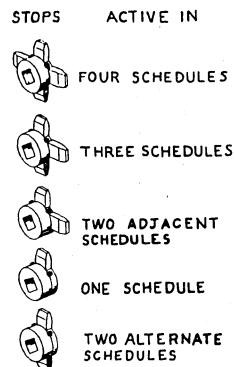


Fig. VI-15

A carriage position is established when a stop in the Sensimatic Control Unit is located between the bumpers of the Carriage Drive Unit. When a stop position is common to two or more schedules it is referred to as a collated stop. This condition is provided for by different styles of stops as illustrated.

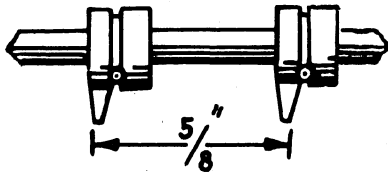


Fig. VI-16

Stops are normally assembled in the control unit with the hubs extending toward the right side of the machine. The overall length of the stop is $3/8$ of an inch. When it is necessary to locate two stops on different schedules closer than $3/8$ of an inch, one stop may be reversed so that its hub is extending toward the left side of the machine.

The control unit, containing the magazines and control pins, moves on the stop shaft when turning from one schedule to another; therefore, the location of stops on the stop shaft is limited. A stop should not be located $1/8$ of an inch to the left of a stop on the preceding schedule; $1/4$ of an inch to the left of a stop on the second preceding schedule; $3/8$ of an inch to the left of a stop on the third preceding schedule.

The design and construction of parts in the basic tabulation and return mechanisms is such that minimum carriage movement is limited to $5/8$ of an inch. Therefore, two stops on the same schedule should not be located closer than $5/8$ of an inch.

A scale in the control unit, calibrated from left to right in $1/8$ inches, provides a reference for locating the stops. The first stop on the left end of the stop shaft should be located at least $1/2$ inch from the end of the scale to permit printing at least four digits on the form.

Selective Tab and Return Disks

Disks on the disk shaft span carriage control lanes 1 through 5. The blank disk is designed so that it may be cut to provide long projections, short projections or no projections in the first five lanes of control. A short projection on a disk in a lane of control is used to index or "open" the lane of control. A long projection on a disk in a lane of control is used to release or "normalize" the lane of control. A projection is not required when a lane of control is to be inactive.

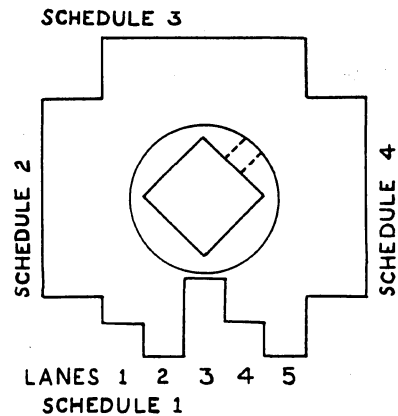


Fig. VI-17

Control lanes one and two do not require short projections as they may be completely indexed by motor bars, however, a short projection may be used in lane one or two when support is necessary for a projection in lane one of the same schedule or lane five of the next higher schedule.

Disk Limitations

When a short projection is used in lanes three, four and five to index a lane of control at a given stop position, the disk containing the short projection should be located, on the disk shaft, directly in line with the stop. This provides alignment of the short projection of the disk and the tappet in the carriage control sensing unit.

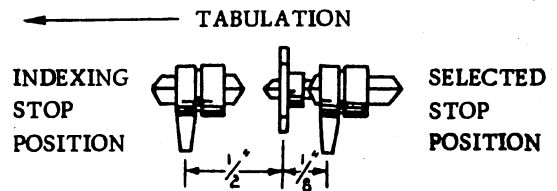


Fig. VI-18

A long projection that releases a lane of control should precede the selected stop by at least $1/8$ inch and should follow the indexing stop by at least $1/2$ inch. In those cases where stops are located between the indexing and selected stops the long projection must not be located closer than $1/8$ inch to the stop adjacent to the selected stop.

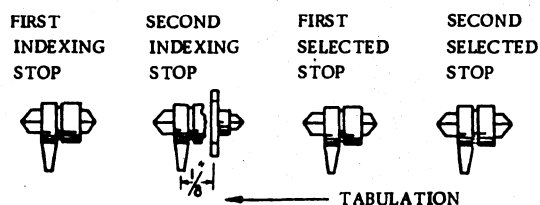


Fig. VI-19

When one lane of control is indexed at two indexing stop positions and the second indexing stop position precedes and is adjacent to the first selected stop position, the condition is referred to as an "overlapping skip" or "overlapping return" depending on which direction the carriage is moving. When this condition exists, the long projection for the first carriage movement should be positioned approximately $1/8$ of an inch following the second indexing stop position.

The limitations that are applicable to the positioning of the long projections are imposed by the construction and function of the basic tabulation and return mechanisms and are explained further under selective tabulation and selective return subjects.

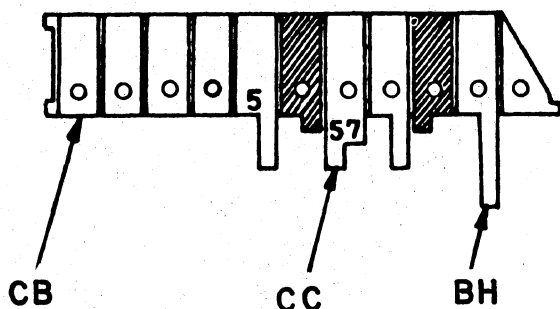


Fig. VI-20

Control pins used for indexing machine functions from lanes 6 through 25 are mounted on magazines that are positioned in two toothed racks in the sensimatic control unit and held in place by a retainer strip.

Control pins BH are provided in various lengths and are numbered 1 through 9A for reference purposes. The No. 1 pin is the longest pin and a No. 8 pin is the shortest pin. The length of a 9A pin is between the No. 7 and No. 8 pins.

Magazine CB is divided into ten sections. Each section of the magazine spans two lanes of control. When the two lanes of control in one section of the magazine are both active, combi-

nation pin CC in different sizes is provided.

Copper plated reference gauges are assembled in the Sensimatic Control Unit at both ends and in the center to facilitate adjusting the unit both in and out of the carriage.

Spear point interlock

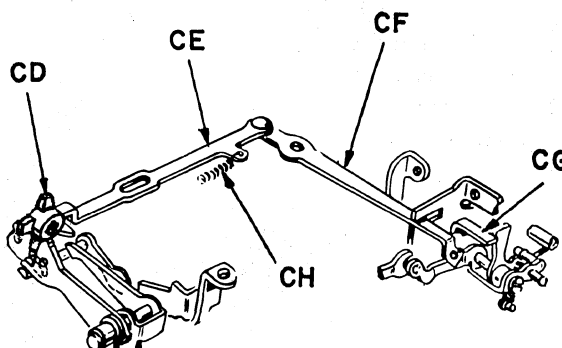


Fig. VI-21

Spear point interlock CE prevents the machine from operating when the carriage is moved out of a stop position.

With the carriage located in a stop position, stop CD cams spear point CE forward holding interlock CF out of the path of drive trip arm CG to allow the drive to trip. When the carriage is moved out of its stop positions, spring CH swings the interlock under the drive trip arm to prevent the machine from operating.

The sensimatic control unit, which is supported by the outer carriage sideframes, is installed when the carriage is in its extreme right or left position by positioning the slotted collars on the job selector knobs into the hooks on the bottom edge of the outer carriage sideframes and latching the hooks on the control unit over posts CS.

When the carriage is moved to either its extreme left or right position latches CV are raised by the camming action of the projections of shaft CI, on screws CJ, thus permitting the job selector knob to be rotated or the control unit removed.

Latches CW are rocked forward through rotation of the job selector knob and, if an attempt is made to move the carriage out of its extreme right or left position with the selector knob only partially rotated, the latches will contact the carriage drive unit sideframes to prevent the carriage from moving.

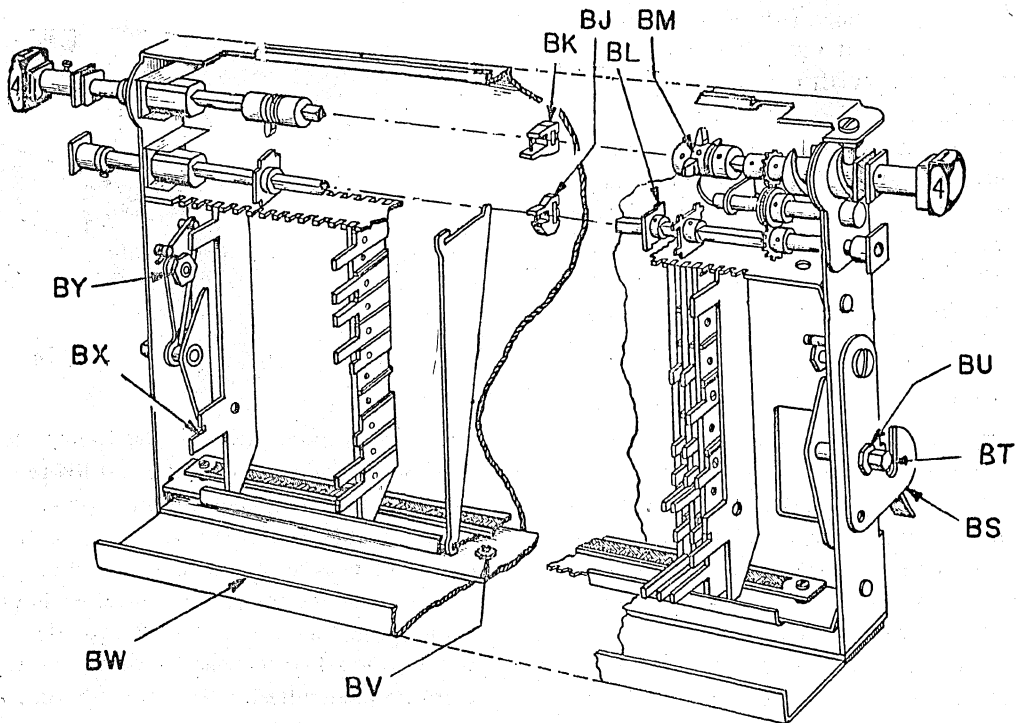


Fig. VI-22

Panel Tests and Adjustments Before Installation in Machines

CAUTION: The end reference magazines must be located no closer than 1 1/8" from the sides of the panel and all reference magazines must be free in the slots of the retainer strips, and limit on the surface of the panel.

C10-2 NOTE: The short rear projection of the center reference magazines must be within plus .004" to minus .003" of the short rear projections of the end reference magazines. The front projection of each end, and center reference magazine, must be within plus .004" to minus .003" of its respective short rear projection. Using the third rail as a straightedge, check the panel shell, while panel is setting in upright position on front or rear edge of panel, to be straight and not bowed or distorted.

C10-3 NOTE: Skip shaft braces BJ must be spaced not more than 5" apart to ensure uniform support and height of the shaft.

C10-4 NOTE: Stop shaft braces BK must be spaced not more than 5" apart to ensure uniform support and height of the shaft.

C10-5 There should be clearance, not to exceed .005" between the split pins in braces BJ and BK and the stop and skip shafts.

TO ADJUST, bend the split pins up or down.
REASON: To prevent excessive movement in the stop and skip shafts.

C10-6 The skip shaft braces BJ should be free, with no more than .003" clearance between the top of the panel and the brace retaining screw head.

TO ADJUST, turn the screw down snug and back off for the required clearance.

REASON: To maintain proper clearance between the skip discs and the skip and return latches.

C10-7 The stop shaft braces BK should be free, with no more than .003" clearance between the top of the panel and the brace retaining screw head.

TO ADJUST, turn the screw down snug and back off for the required clearance.

REASON: To maintain the proper clearance of the stops over the bumpers.

C10-8 With height gauge (Kit 427) placed parallel to the magazines and a slight downward pressure on the skip shaft to remove any lost motion, there should be .003" clearance between the arm of the gauge and the skip discs adjacent to the skip shaft braces and anything less than .010" between the gauge and the other skip discs.

TO ADJUST, when the skip shaft is below the low limit, shims may be used under the braces.
REASON: To maintain the skip discs in correct relation to the skip and return latches.

C10-9 With height gauge (Kit 427) placed parallel to the magazines and a slight downward pressure on the stop shaft to remove any lost motion, there should be .003" clearance between the arm of the gauge and the stop adjacent to the stop shaft braces and anything less than .010" between the gauge and the other stops. Check all four schedules.

TO ADJUST, when stops BM are below the low limit, place shims under braces as needed.

REASON: To maintain the stops in correct relation to the bumpers.

C10-10 The control pins, stops and skip discs must be in alignment.

TO ADJUST, clip the comb gauge (Kit 406 No. 1) on the left edge of the panel between the stop and disc shafts and move the stops and discs to align centrally with the projection on the gauge.

REASON: To align the discs and control pins with the tappets when the stops are located between the bumpers.

Tests and Adjustments for Panels Installed in Machines

C10-11 Control panel latches BS (Fig. VI-22) should hold the panel forward without binding. Schedule selector knobs should turn freely.

TO ADJUST, turn eccentrics BY (Fig. VI-22) as required.

REASON: To hold panel firmly in position yet allow free lateral movement.

NOTE: Machines and panels prior to roll CM (Fig. VI-23) construction should be adjusted to have .047" go and .053" no go clearance between reference magazine and tappets in end positions and no less than .040" at the front center reference.

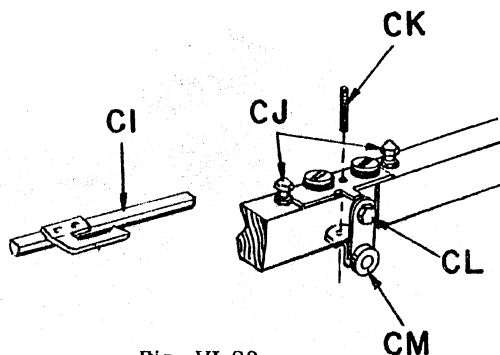


Fig. VI-23

C1-98

C10-12 With roller assembly CM lowered to an inactive position and the third rail BW removed, insert the panel into the carriage.

There should be .040" GO to .046" NO GO clearance between the tappet in lane 6, and lane 21, and the reference magazines in the center, right and left ends of the panel.

NOTE: Stop dogs must not be resting on top of bumpers when adjusting panels to obtain .040" GO to .046" NO GO clearance.

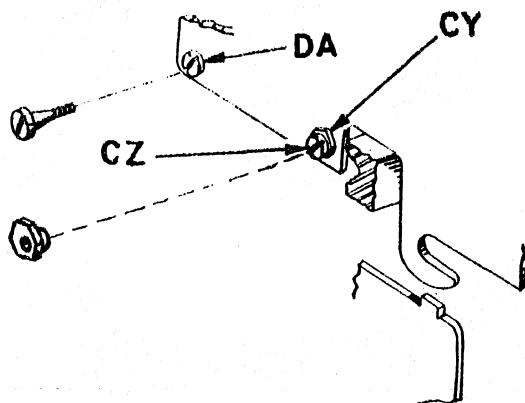


Fig. VI-24

TO ADJUST front ends of panel:

(a). With the high point of eccentrics CR to the rear, loosen screws DA and CZ in the right side frame.

(b). Adjust CY as required and tighten DA and CZ.

(c). Repeat (a) and (b) for left sideframe.

TO ADJUST center of panel:

NOTE: Place a .040" gauge between lane 21 tappet and center reference magazine to hold the rear end of the panel in approximate position while checking the following adjustment.

(a). Raise roller assembly CM as required.

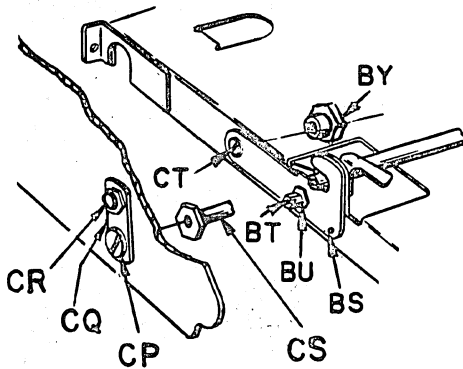
Carriage

Fig. VI-25

TO ADJUST rear ends of panel:

- (a). On first panel of multi-panel installation adjust eccentrics CR as required.
- (b). On additional panels turn eccentrics BU as required.

TO ADJUST rear center of panel: Reassemble third rail BW remove BV and leave CN loose to prevent a false limit while setting BW.

- (a). Place .003" gauge between lower roller and BW in end positions and tighten end screws CO. Caution: Be sure hooks BS are not lifted off of CS.
- (b). Adjust BV as required and tighten remaining screws CO, then tighten CN.

REASON: To provide uniform height of panel and proper clearance between panel and its relative assemblies.

C10-13 With the form chutes placed in the carriage, there should be from .001" to .003" clearance between the form chute cross bar and the eccentric studs CU on top of the panel. This clearance is to be checked when the eccentrics are located over the tappets. On machines with split platens, the space indexing skids should be set to active position to avoid a false limit.

TO ADJUST, turn the eccentric studs CU on top of the panel.

REASON: To maintain the position of the panel at the front edge when the sensing tappets thrust upward to index carriage controlled functions.

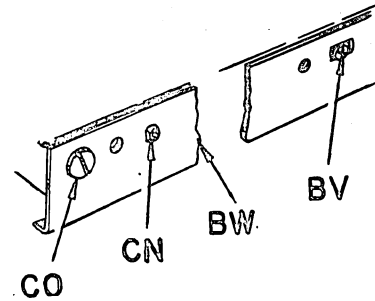


Fig. VI-26

C10-14 NOTE: With the panel mounted in the carriage, the selector knob interlocks must drop freely to their lowest position to lock the stop and skip shafts in their square detented positions in the spring clips. The front edge of the stops must be in correct vertical alignment with the spearpoint, and the bottom edge of the skip discs must be in correct horizontal alignment with the skip and return latches.

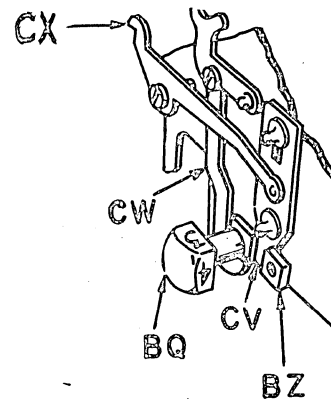


Fig. VI-27

C12-18 With the carriage in its extreme right or left end position, the bottom edges of latches CV should be positioned to clear the bottom edges of the outer carriage sideframes by no less than .003". Arms CX should provide uniform movement to latches CV.

TO ADJUST, turn screws CJ up or down as required and lock with nut. Bend arms CX to obtain uniform movement of latches CV.

NOTE: The ears on shaft CI are not to be adjusted.

REASON: To permit schedule selection, and removal of the panel.

Carriage

C12-27 With the program selector knob turned fully to any of its four (4) positions, there should be passing clearance between the formed ears of interlocks CW and the upper projections of the gear box side plates.

TO ADJUST, bend the formed ear on interlock CW.

REASON: To prevent interference of carriage movements.

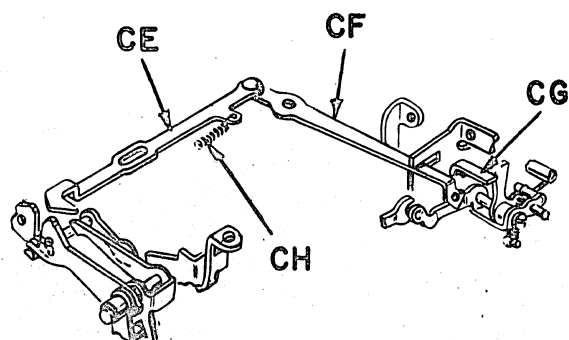


Fig. VI-28

P11-10 With the carriage in a stop position, spearpoint CE should be centrally located between the bumpers and parallel to the top plate of the gear box. Interlock CF should clear arm CG by at least .025".

TO ADJUST, weave spearpoint CE at its offset, maintaining parallel relation to the top plate of the gear box.

REASON: To maintain correct relation between the spearpoint interlock and the stop dogs, and to ensure holding interlock CF clear of drive trip arm CG.

P11-11 With the carriage out of a stop position, the ear of arm CG should have a full hold, less .005" to .010" on interlock CF.

TO ADJUST, weave arm CF.

REASON: To prevent a machine operation with the carriage out of a stop position.

SENSIMATIC CONTROL UNIT, FLEXIBLE

(Fig. VI-28-1)

The flexible control panel can be easily recognized by the lack of welding at all four corners of the control unit pan. This allows the pan to be flexible to changing movement when the carriage is moving, but will maintain a given,

fixed clearance of the pins over the tappets when the carriage is in a position to operate.

On all machines of current construction, new posts M are used. New posts M are ground flat on one side and will replace the present round posts. The new posts M can be used for all types of rear insertion panels, the location of the flat side being the deciding factor.

When inter-mixing regular and flexible panels on the same machine, the old round posts or the new flat sided posts M may be used. However, if the new flat sided posts M are used, the flat side must face rearward. Both styles of panels must then be adjusted by using regular panels adjust - ments.

On all machines that will be using flexible panels only, whether single or multiple, it will be necessary that both new style flat sided posts M be used. It will also be necessary to use eccentric U, roller T, screw V, and bracket AB if applicable. Flexible panel adjustments must be used.

Flexible Panel Installation

All panel tests and adjustments before installation in machines applied to regular panels are applicable to flexible panels.

Tests and adjustments for flexible panels installed in machines.

NOTE: When adjusting the flexible control panel for desired clearance between reference magazine A and sensing tappets B, the stop dogs must not be resting on top of the bumpers or stop latches.

C10-12 Remove the third rail Z and eccentric Y. Lower roller assembly D, which supports the front edge of the panel, to an inactive position. Turn posts M, located in the right and left carriage end plates, so that the flat surface is facing down. Turn eccentrics J so that the high points are rearward. Turn eccentrics O, in left and right sides of panel, so high point is rearward. Insert flexible panel into the carriage. There should be .043" go, .048" no go clearance between tappets B in lane 6 and 21, and front and rear projections of reference magazine A at right end, center and left end of panel.

TO ADJUST FRONT OF PANEL - AT ENDS.

(a) Loosen screws E and G in right carriage side frame. Turn eccentric H as required. Tighten screws G and E.

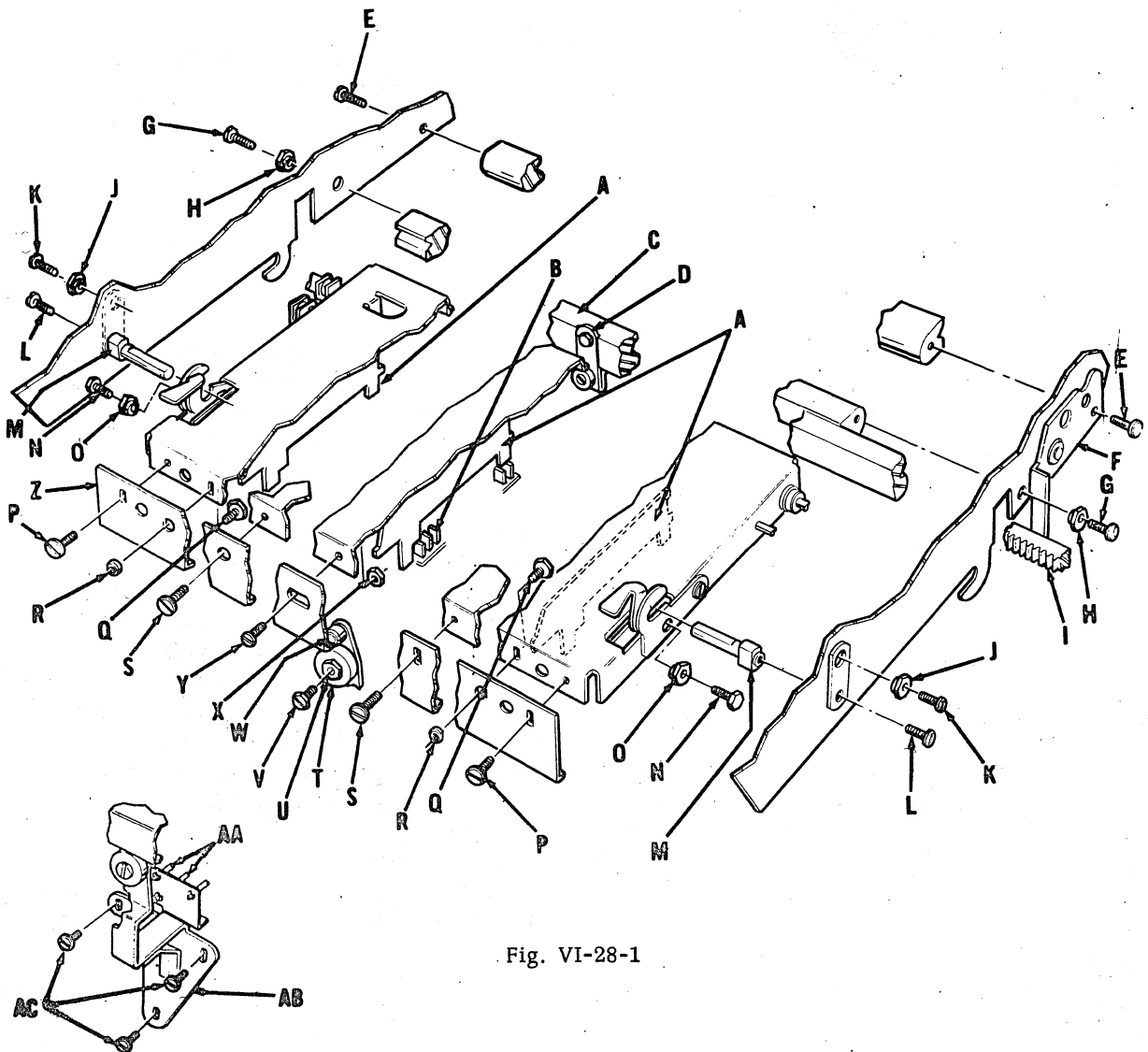
Carriage

Fig. VI-28-1

(b) Loosen screws E and G in left carriage side frame. Turn eccentric H as required, tighten screw G.

(c) Locate bracket F to have .005" to .010" clearance with rack I and tighten screw E.
TO ADJUST FRONT CENTER OF PANEL-AT ENDS:

(a) Raise roller assembly D as required.

TO ADJUST REAR OF PANEL - AT ENDS

As a pre-set for those machines having bracket AB, the vertical slots in bracket AB should be

aligned centrally to its retaining screws AC and positioned so that switch shafts AA are accessible. Tighten screws AC.

(a) On first panel of a multi-panel installation, loosen screws K and L, turn eccentric J as required. Tighten screws K and L. (Be sure post M did not turn.)

(b) On additional panels, use eccentric O to get proper panel height.

NOTE: After adjusting eccentrics J, recheck the

Carriage

clearance of lane 6 and if necessary, readjust eccentrics H and roller assembly D.

TO ADJUST REAR OF PANEL - AT CENTER.

(a) Reassemble third rail Z to panel, leaving two "D" nuts R and screws Q, and four screws P and S, loose.

(b) Turn eccentric U to lower roller to its lowest position. Install panel in carriage.

(c) With reference magazines A in right and left ends of panel located over sensing tappets B, manually raise third rail Z up against top guide roller W, maintaining .043" go, .048" no go clearance between reference magazine and tappets in lane 21, making sure panel hooks are not lifted off posts M. Tighten two outside screws P.

NOTE: Use present go-no go gauge, 1623 7257, to obtain this clearance.

(d) Assemble eccentric screw Y and nut X to panel and with reference magazine A in center of panel located over tappets B, turn eccentric Y to provide .043" go, .048" no go clearance between center reference magazine and tappets. Tighten two center screws S.

(e) Remove panel, tighten nut X on eccentric Y, tighten two screws Q holding "D" nut R, replace panel.

(f) With reference magazine in center of panel located over tappets, manually hold third rail Z up against top guide roller W. Turn eccentric U to provide clearance not to exceed .003" between lip of third rail Z and bottom guide roller T. Tighten screw V.

(g) Turn posts M, in right and left carriage side

frames, so that their flat surface is facing up. Manually move the carriage in the right and left directions, checking for no bind as the third rail travels between guide rollers T and W.

REASON: To provide uniform height and proper clearance between the flexible panel and its relative assemblies.

Use regular adjustments to position stop dogs, align control pins, etc.

SPACE THE FORMS

The various forms which are used in the posting operations performed by the Sensimatic machine are advanced vertically around the platen by the spacing mechanism when indexed from carriage control or from depression of motor bars Nos. 1 and 3. Form spacing is also indexed during each machine operation when the machine is used for listing work with the Sensimatic Control Lever in its rearward position.

Spacing is controlled by the setting of the space control lever which permits spacing from 0" to 1" in multiples of 1/6". Carriages are also modified to provide 1/4" and 1/5" spacing when required by the customers forms.

Form spacing is indexed when space control slide D is lowered into active position in the path of the stud in kicker arm C.

Motor bar No. 1 controlled form spacing is indexed when depression of the motor bar rocks lever M and links L and A to rock lever H through

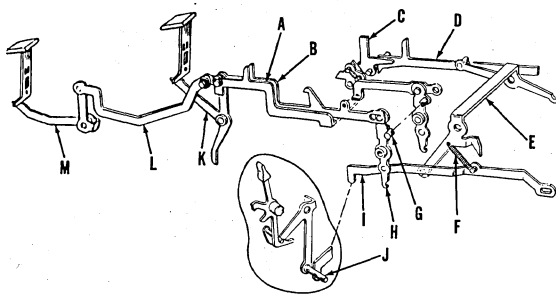


Fig. VI-29

stud G. Rocking of lever H moves link I rearward to permit spring F to swing bail E, thus lowering space control slide D into active position.

Motor bar No. 3 controlled form spacing is indexed when depression of the motor bar rocks lever K and link B to rock lever H, thus moving link I rearward.

When the Sensimatic Control Lever is in its rearward position, stud J holds link I in its rearward position, thus indexing the form space control slide.

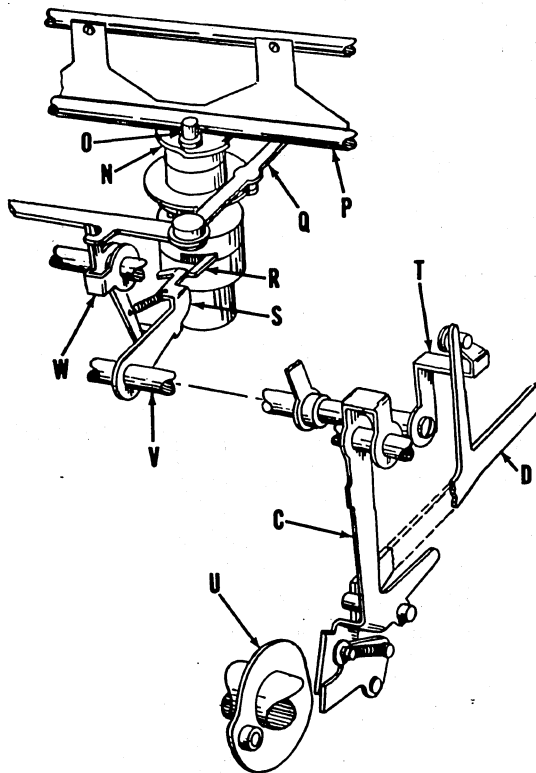


Fig. VI-30

When the machine operation reaches the approximate 167 degree point, rotation of the main camshaft, through cam U, rocks kicker arm C to move space control slide D rearward where its upper projection contacts arm T and rocks shaft assembly V. Rocking of the shaft assembly lowers arm S out of the path of clutch dog R, thereby permitting engagement of the form space clutch. With the clutch engaged, rotation of the upper clutch member swings space bail P rearward through disc N and roller O.

Shaft assembly V is latched in its indexed position by latch W which holds arm S in a lowered position to prevent it from interfering with the clutch dog until rotation of the spacing clutch moves the clutch dog out of the range of the arm. As the spacing clutch rotates, detent arm Q releases the latch to release the arm and shaft assembly and permit the arm to be positioned into the path of the clutch dog to release the dog and disengage the clutch at the end of the spacing operation.

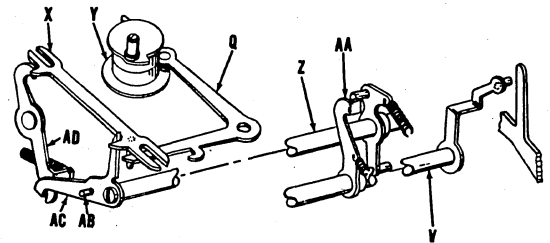


Fig. VI-31

Rocking of shaft assembly V to index from spacing also rocks shaft assembly Z through the formed ear of arm AA. Shaft assembly Z rocks lever AC to hold the motor switch points closed through stud AB. The lever is latched by latch AD. As the form space clutch rotates, detent arm Q, which locates the clutch in normal position through a notch in disc Y, moves slide X rearward when on the high portion of disc Y. Rearward movement of the slide holds the switch points closed through its forward projection until the completion of the form spacing operation and also releases latch AD to permit lever AC to restore to normal and open the switch points when detent arm Q seats in the notch of the clutch disc at the end of the spacing operation and slide X moves forward.

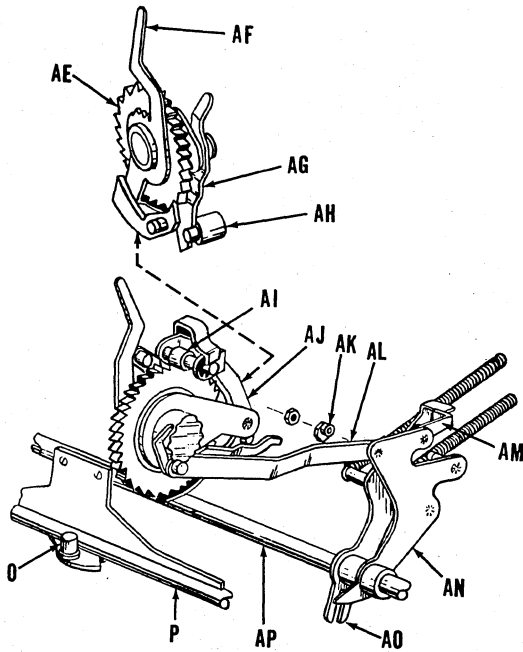


Fig. VI-32

When the form spacing clutch rotates, roller O swings bail P rearward rocking shaft assembly AP. Rocking of the shaft assembly moves the rear formed ear of arm AO forward to move space pawl AJ forward through link AM, arm AN, and link AL. Forward movement of the space pawl turns the platen, through ratchet AE, thus spacing the forms. The platen and ratchet are held in normal position by detent AI under spring tension.

The lower portion of space control lever AF is positioned to permit 0" to 1" spacing in sixths of an inch by controlling the number of ratchet teeth to be engaged by the space pawl. Overthrow of the space pawl is prevented by arm AG which limits on post AH when the space pawl reaches the end of its forward travel.

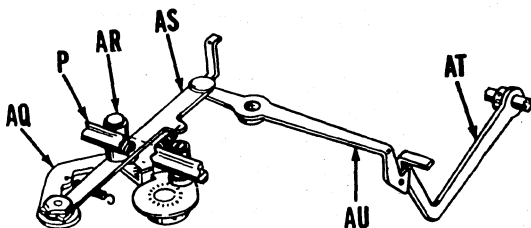


Fig. VI-33

Latch AQ, which is released when the form space clutch rotates, retains interlock AU clear

of drive trip arm AT by blocking slide AS from moving rearward during form spacing operations, until bail P contacts roller AR to hold slide AS forward, thereby preventing a delay of the drive trip during repeat operations in which form spacing takes place.

Form Spacing Indexed by Carriage Controls

When an accounting application requires spacing the forms vertically around the platen, a No. 5 control pin in lane 13 causes the space control slide on the side of the Carriage Drive Unit to be lowered so that the spacing function may be automatically indexed during the machine cycle.

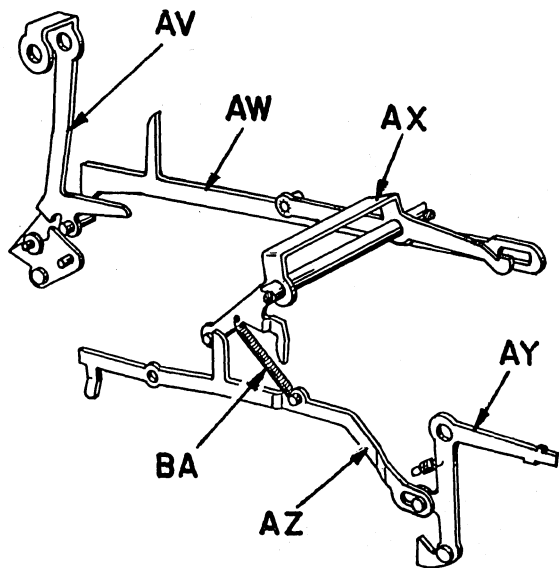


Fig. VI-34

A No. 5 control pin in lane 13 rocks bell crank AY through the Carriage Control Sensing Unit. Movement of bell crank AY pulls link AZ rearward to rock bail AX through spring BA. Bail AX lowers space control slide AW into the path of kicker arm AV so that spacing will be indexed during the machine cycle.

OPENING AND CLOSING THE CARRIAGE

To permit insertion and removal of the various posting forms, the carriage is automatically closed at the beginning of each machine operation (if it is open) and may be indexed to

open from carriage controls. The carriage may also be opened and closed manually by depressing the carriage open/close key. Both manual and carriage controlled carriage opening and closing are indexed through the same control slide and clutch assembly.

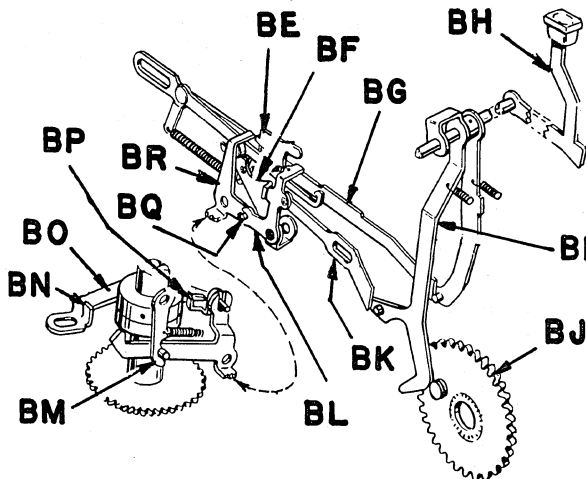


Fig. VI-35

With the carriage closed, depression of open/close key BH moves control slide BG rearward rocking bail BR rearward through lever BE. The rocking of bail BR moves bellcrank BL forward and clutch release slide BO rearward to release the clutch dog and permit rotation of the lower clutch member to rotate the upper member of the carriage opening and closing clutch assembly. The rearward movement of the clutch release slide positions its formed ear BN into the path of the clutch dog to disengage the clutch after half a revolution (180°) of the upper clutch member. Detent BM holds the clutch release slide and bail BR in their indexed positions.

With the carriage open, bellcrank BL is in its forward position permitting lever BF to raise the forward hooked portion of the latch on the control slide in line with the formed ear of bellcrank BL. When the control slide is moved rearward, the hooked portion of latch BE rocks bellcrank BL to rock bail BR through stud BQ. Rocking of bail BR moves the clutch release slide forward permitting the clutch dog to engage. The forward movement of clutch release slide BO also positions its formed ear BP into the path of the clutch dog to disengage the clutch after a half revolution of the upper member.

If the machine is operated with the carriage open, a carriage close operation is automatically indexed at the beginning of the machine cycle by the roll on gear BJ which rocks kicker arm BI to move link BK rearward rocking bellcrank BL.

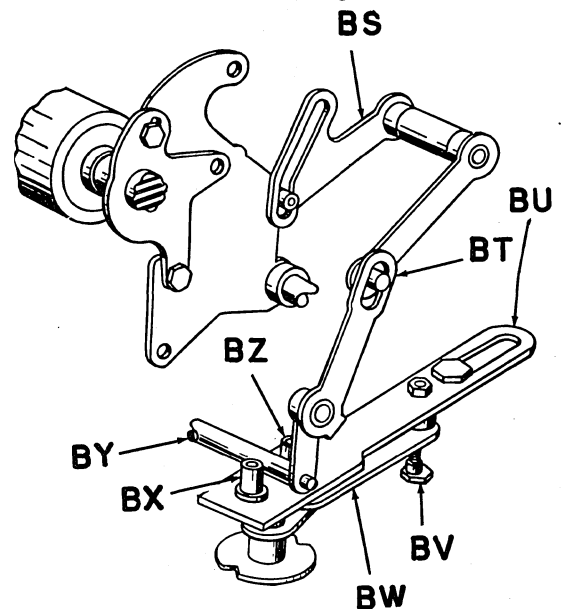


Fig. VI-36

With the carriage open/close clutch engaged, a half revolution (180° rotation) of the upper clutch member drives slide BU forward, through link BW, to open the carriage and, when the clutch is engaged to rotate the remaining 180 degrees, it drives slide BU rearward to close the carriage. When slide BU is moved forward, roll BZ swings bail assembly BY forward rocking cam assemblies BS downward through arms BT. Rocking of the cam assemblies opens the carriage by swinging the inner carriage rearward through the

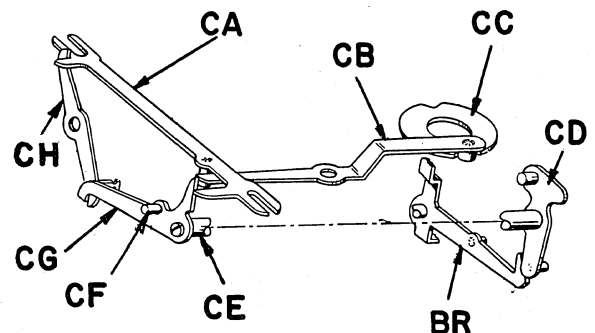


Fig. VI-37

enclosed cams. When slide BU is moved rearward, roll BX swings bail assembly BY rearward rocking the inner carriage forward through the enclosed cams, thus closing the carriage.

Rocking of bail BR to move the clutch release slide also closes the motor switch points each time carriage opening or closing is indexed. When bail BR is rocked, the spear point on its forward end cams arm CD rocking shaft CE which lowers lever CG to close the motor switch points through stud CF. The lever is held in its lowered position by latch CH. As the upper clutch member rotates, detent arm CB, which holds the clutch member in normal position through the notches in disc CC, moves slide CA rearward when on the high portion of disc CC. Rearward movement of the slide holds the switch points closed until the completion of the carriage opening or closing operation and also releases latch CH to permit lever CG to restore to normal and open the switch points when detent arm CB seats in one of the notches of the clutch disc at the end of the opening or closing operation and slide CA is permitted to move forward.

Since the carriage opening operation is indexed late in the machine cycle and is not completed until after the machine cycle is completed; and since the carriage must be fully opened and then fully closed before printing takes place in the next machine cycle, an interlock is provided to prevent a machine operation until the carriage is fully opened, thus insuring adequate time for the carriage to close prior to printing after a machine operation is indexed.

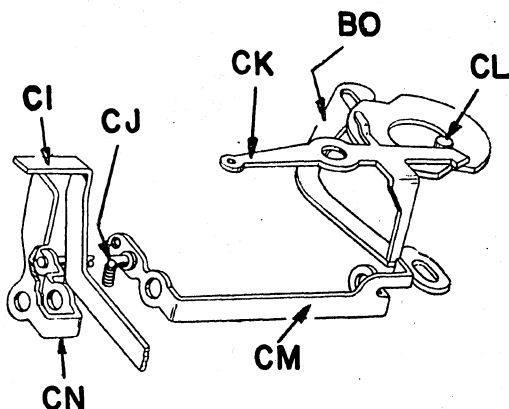


Fig. VI-38

When clutch release slide BO is moved rearward to index carriage opening, spring CJ swings bail CM to position interlock CN under the formed ear of drive trip arm CI, thus preventing a machine operation from being indexed until the carriage is fully opened. At the end of the carriage opening operation stud CL rocks lever CK to rock bail CM and swing the interlock clear of the drive trip arm.

When clutch release slide BO is moved forward to index carriage closing, it prevents bail CM from being rocked, thus holding the interlock clear of the drive trip arm.

An interlock is also provided to prevent a carriage closing operation from being indexed when the paper table is tilted rearward, thus safeguarding against the carriage accidentally being closed when the operator is installing a journal roll or adjusting posting forms.

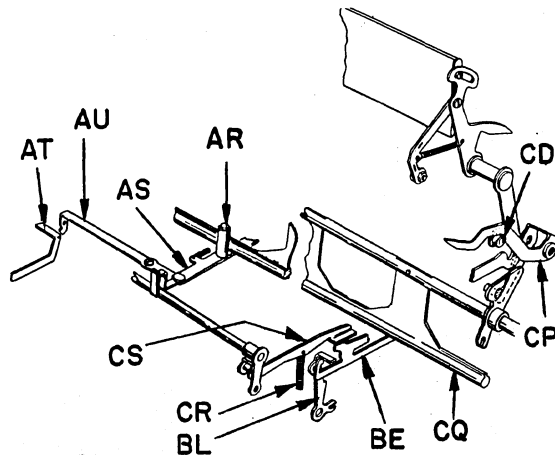


Fig. VI-39

When the carriage is open and the paper table is tilted rearward, stud CO rocks bellcrank CP which moves form spacing bail CQ rearward allowing slide CT to move rearward. When slide CT moves rearward, spring CR lowers paddle CS which lowers latch BE to an inactive position to prevent the forward hooked portion of the latch from contacting bellcrank BL to index carriage closing if the carriage open/close key is depressed, thus preventing a carriage closing operation until the paper table is moved forward to its normal position.

Carriage Opening Indexed by Carriage Control

A No. 5 control pin in lane 14 will position the carriage opening control slide on the side of the Carriage Drive Unit to cause carriage opening to be indexed during the machine cycle. A carriage control is not necessary to index carriage closing since the carriage closes automatically at the beginning of the machine cycle.

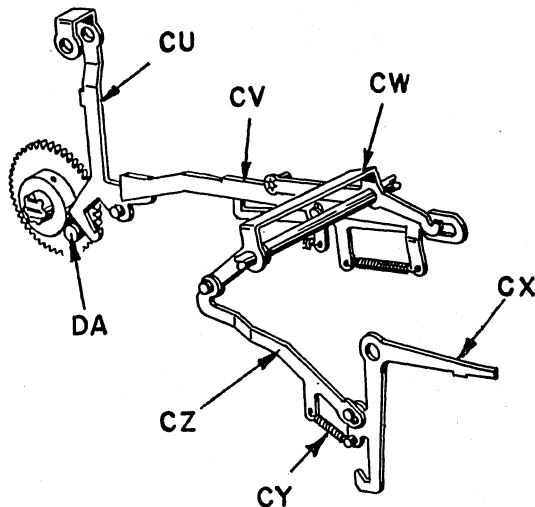


Fig. VI-40

Carriage opening is partially indexed when a No. 5 control pin in lane 14 rocks bellcrank CX through the Carriage Control Sensing Unit. Rocking bellcrank CX pulls link CZ rearward through spring CY to rock bail CW. Bail CW lowers carriage opening slide CV into the path of kicker arm CU. At approximately 306° in the machine cycle, roll DA on the main camshaft causes kicker arm CU to drive the carriage opening slide rearward to complete the indexing of carriage opening.

Tests and Adjustments

C13-10 With space slide D at even height with the tab slide, insert a .030" wire gauge between the slot in the rear of space slide D and its guide post. With the space slide actuated to limit on the .030" gauge, the projection on slide D must be free and should not bind on the stud of arm T.

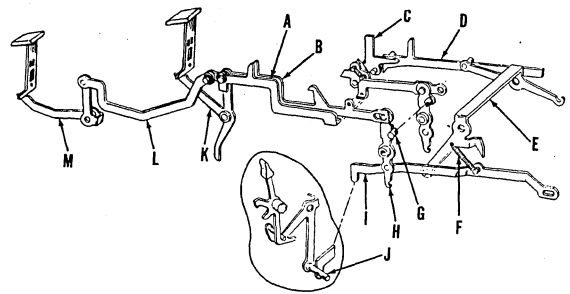


Fig. VI-41

TO ADJUST, bend the formed ear of arm AA. **REASON:** To prevent a false limit between projection on slide D and the stud in arm T, when indexing a space operation.

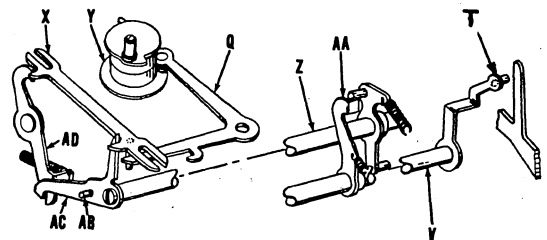


Fig. VI-42

C13-11 With space slide D indexed to release the space clutch dog, rotate the clutch to position the roller of arm Q on the high portion of cam Y. The formed ear of arm AC should be held from .000" to .010" below the step of latch AD.

TO ADJUST, weave arm Q.

REASON: To ensure retaining the motor switch points closed until the completion of the spacing operation.

C12-7 With the carriage closed and the machine manually cycled until space pawl AJ is moved to its extreme forward position against ratchet gear AE, the platen should be spaced in multiples of $1/6"$ as indicated by space selector AF. **TO ADJUST**, turn eccentric AK as required, starting with the high side down.

REASON: To ensure uniform spacing of the platen.

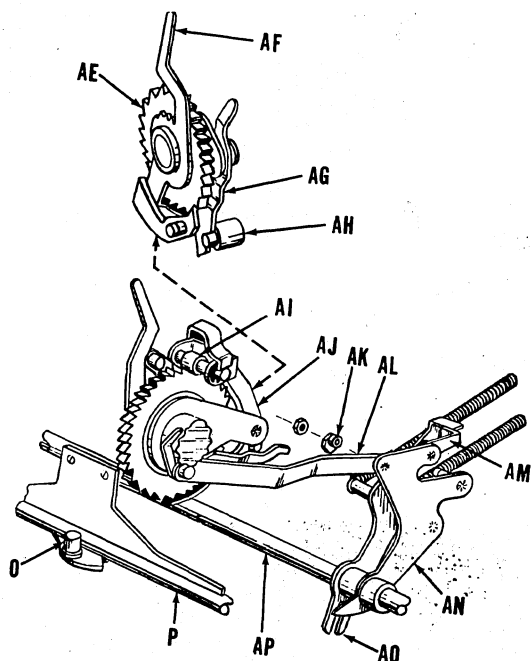


Fig. VI-43

C12-8 With space pawl AJ in its extreme forward position and adjusted in accordance with test C12-7, there should be no more than .006" clearance between the limit arm and eccentric post AH.

TO ADJUST, turn eccentric post AH as required.

REASON: To prevent overspacing of the platen.

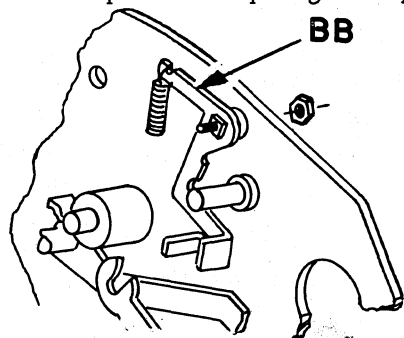


Fig. VI-44

C12-9 With the space selector set for one-inch spacing, and the upper paper table in its extreme rearward position, there should be no less than .015" clearance between space pawl AJ and ratchet AE.

TO ADJUST, bend rear end of limit BB as required.

REASON: To prevent interference from the space pawl, when turning the platen backwards.

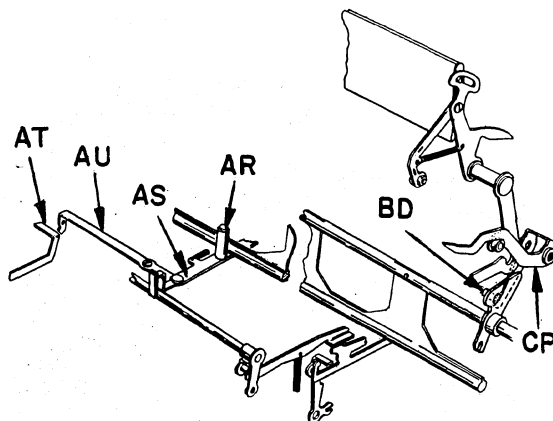


Fig. VI-45

C12-30 There should be .001" to .003" clearance between bail CP and stud BD.

TO ADJUST, weave bail CP.

REASON: To allow the feed shaft assembly to limit against the feed cam roller.

P6-2 With the carriage open and the paper table rearward, interlock AU should latch under arm AT with a full hold minus .005" to .010".

TO ADJUST, bend interlock AU forward or rearward.

REASON: To prevent a drive trip when the paper table is rearward.

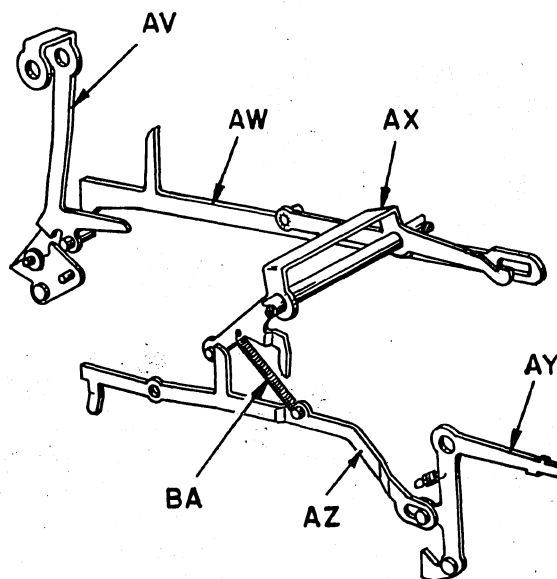


Fig. VI-46

C23-1 With the carriage control normalizing lever forward, and space slide AW in its raised position, there should be .001" to .003" clearance between the stud on spacing bail AX and space slide AW.

TO ADJUST, weave spacing bail AX.

REASON: To prevent a false upward limit for space slide AW.

C23-2 With bellcrank AY of lane 13 (form spacing) latched by the latch plate, space slide AW should be lowered to its indexed position.

TO ADJUST, recheck test C23-1.

REASON: To ensure lowering space slide AW into the path of the stud on kicker arm AV

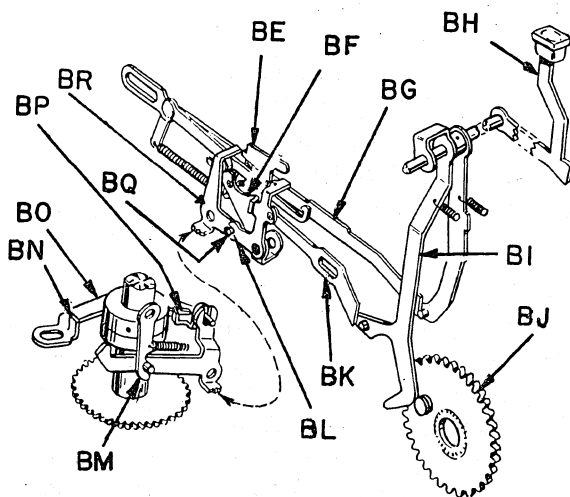


Fig. VI-47

C13-7 With slide BK slowly indexed to move clutch release slide BO rearward and arm BR past lower stud in CD, there should be .005" to .010" latching lead of the ear of arm CG below the step of latch CH.

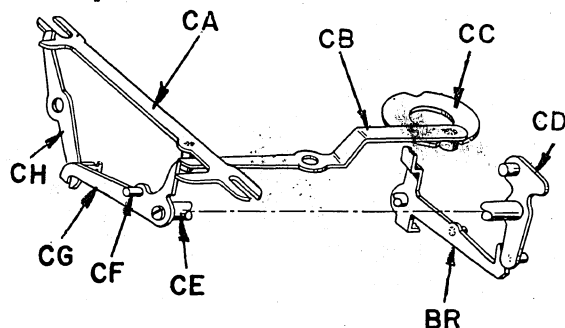


Fig. VI-48

TO ADJUST, weave the lower arm of CD.

REASON: To ensure latching of the motor switch points in initial closed position for a manual carriage open or close operation.

C13-12 With slide BG indexed to actuate the carriage open and close clutch, rotate the clutch to position the roller of arm CB on the high portion of cam CC. The formed ear of arm CG should be held from .000" to .010" below the step of latch CH.

TO ADJUST, weave arm CB.

REASON: To ensure retaining the motor switch points closed until the completion of carriage opening or closing operations.

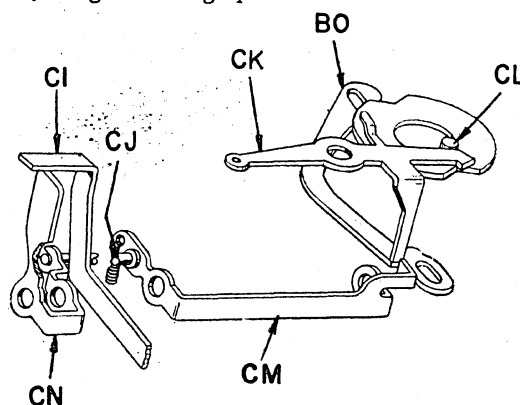


Fig. VI-49

C13-8 With clutch release slide BO indexed to its forward position and the carriage closing operation completed, there should be .003" to .005" clearance between stud CJ and the top of the hole in the left side plate of the gear box.

TO ADJUST, weave bail CM.

REASON: To permit full shifting of clutch release slide BO to its forward position and ensure holding interlock CN in its inactive position.

C13-9 With clutch release slide BO indexed to its rearward position and the carriage opening operation completed so that the lower finger of pivot arm CK is against bail CM, there should be .003" to .005" clearance between stud CJ and the top of the hole in the left side plate of the gear box.

TO ADJUST, bend the lower finger of pivot arm CK.

REASON: To ensure holding interlock CN in its inactive position with the carriage fully opened.

P11-8 With machine and bumpers normal, partially depress and hold error key, then depress motor bar No. 2, slowly restore error key until the ear of drive trip arm CI is raised parallel to the top of interlock CN. At this point there should be .010" to .040" clearance between the front edge of arm CI and the rear edge of interlock CN.

TO ADJUST, weave interlock CN.

REASON: To ensure blocking drive trip arm CI when the carriage is being opened, and provide safe clearance between arm CI and interlock CN when the carriage is fully opened.

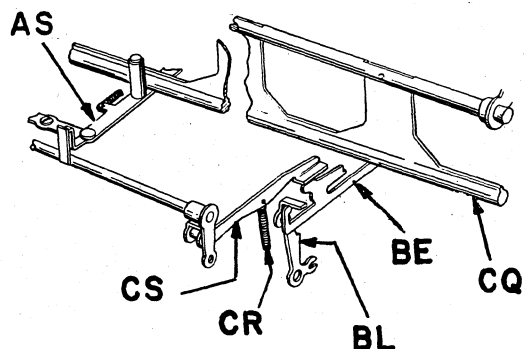


Fig. VI-50

C13-13 With the carriage open and arm CS raised to clear latch BE, index slide BG so that latch BE is in its lower position. Rotate the carriage open and close clutch to position the roller on arm CB on the high portion of cam CC. There should be .005" to .015" clearance between arm BF and roll on BE.

TO ADJUST, bend the formed ear of arm BF that contacts arm BL.

REASON: To ensure latch BE remaining in its lowermost position when slide BG is actuated.

C13-14 With the carriage closed and arm CS raised to clear latch BE, index slide BG and rotate the carriage open and close clutch to position the roller on arm CB on the high portion of cam CC. Lever BF should raise latch BE to the top of the guide slot in slide BG.

TO ADJUST, recheck adjustment for test C13-13.

REASON: To locate latch BE in its fully raised position.

C13-15 With latch BE in its lower position, actuate slide BG until latch BE contacts the formed ear of arm BR. There should be no less than .025" clearance between the ear of arm BR over the step of latch BE.

TO ADJUST, bend the ear of arm BR up or down.

REASON: To retain the step of latch BE under the ear of arm BR until arm BR is in its rearmost position.

C13-16 With latch BE in its raised position, actuate slide BG sufficiently to move the hooked projection of latch BE against the formed ear of arm BL. There should be no less than .025" clearance of the hooked projection over the formed ear of arm BL.

TO ADJUST, bend the formed ear of arm BL up or down.

REASON: To retain the hooked projection of latch BE over the formed ear of arm BL until arm BL is in its rearmost position.

C13-40 With slide BG actuated to position latch BE in its raised position, there should be .010" to .040" clearance between arm CS and latch BE.

TO ADJUST, bend ear toward or away from finger AS.

REASON: To ensure that arm CS does not contact latch BE when the upper paper table is at normal, and is disabled when the paper table is moved out of normal position.

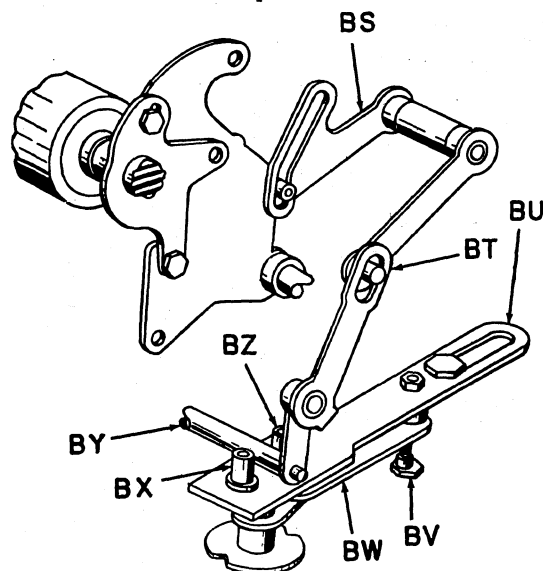


Fig. VI-51

C12-12 The open and close bail and the space bail should be parallel with .010" from end to end.

TO ADJUST, weave the bails as required.

REASON: To provide uniform movement of the bails with the carriage in the center and end positions.

C12-15 With the carriage in its central position, there should be equal clearance between the rolls of the inner carriage sideframes and the ends of the enclosed cam in arms BS, when the carriage is in the opened and closed positions.

TO ADJUST, turn eccentric BV as required.

REASON: To ensure correct timing of the carriage closing in relation to printings.

C12-16 With the carriage in an open or closed position, there should be at least .003" clearance between bail BY and roller BX and BZ, from end to end of the bail.

NOTE: The clearance is to be determined visually when manually moving bail back and forth between the rollers.

TO ADJUST, weave bail BY as required. Re-check C12-12.

REASON: To prevent binding of the carriage and ensure sufficient travel of the bail to open and close the carriage.

C28-1 With carriage opening slide CV in its raised position, there should be clearance not to exceed .003" between the stud on carriage opening bail CW and carriage opening slide CV.

TO ADJUST, weave carriage opening bail CW as required.

REASON: To prevent a false upward limit of the carriage opening slide.

C28-2 With bellcrank CX of lane 14 (carriage opening) latched by the latch plate, carriage opening slide CV should be lowered to its indexed position.

TO ADJUST, recheck test C28-1.

REASON: To ensure indexing carriage opening slide CV into the path of the stud on kicker arm CU.

CARRIAGE TABULATION AND RETURN

The carriage tabulation and return mechanisms provide a means of moving the carriage to the left (tabulation) or right (return) to position the various columns of the posting forms into printing position. The carriage is retained in its various positions through the stops in the Sensimatic control unit.

Carriage tabulation or return may be indexed manually by depressing the tabulation or return control keys; and tabulation is indexed automatically from machine operation when the Sensimatic control lever is set in its forward position. Tabulation and return is also indexed from motor bars and automatically from carriage controls. This subject covers the operation of the tabulation and return mechanisms together with the related interlocks and the brake mechanism used to stop the carriage.

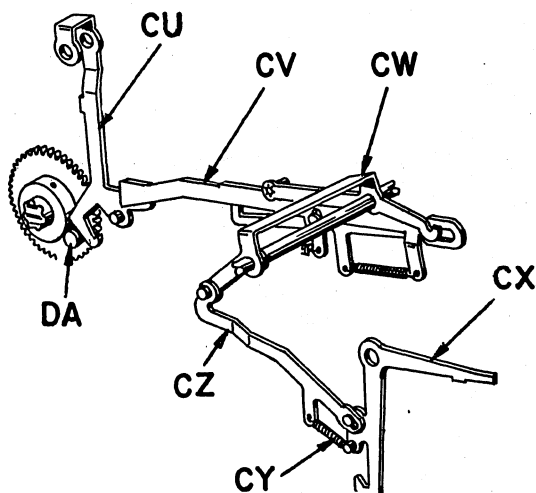


Fig. VI-52

Tabulation

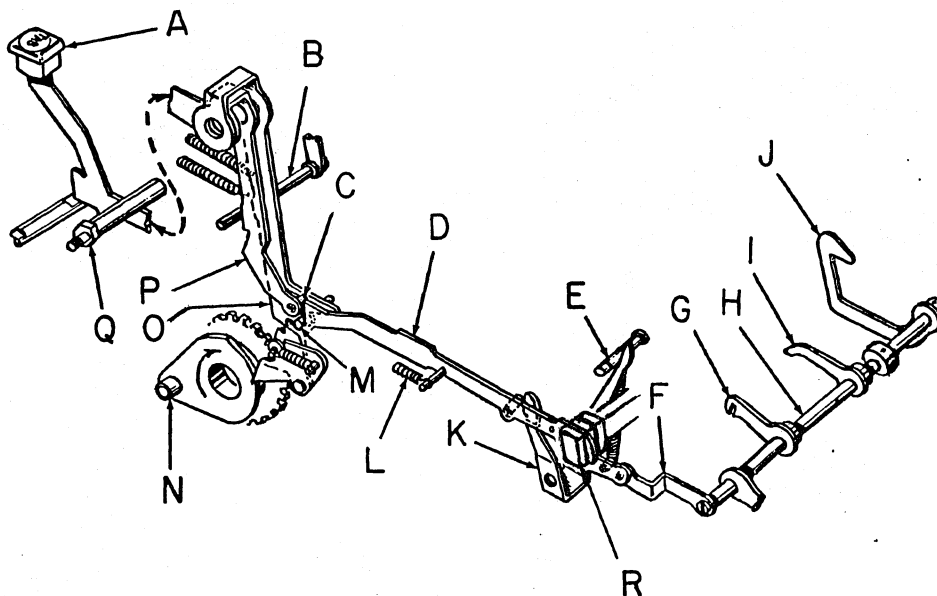


Fig. VI-53

Carriage tabulation is indexed manually when tabulation key A is depressed, rocking lever P which, through stud C, moves tabulation control slide D rearward.

The carriage tabulation mechanism is indexed automatically, during the latter portion of a normal machine cycle, when roll N on the main operating camshaft rocks kicker arm O to move tabulation control slide D rearward through stud M. The tabulation control slide is held in a normally active position by spring L, but it may be raised out of the path of stud M to an inactive position from various sources to disable its automatic function.

The rearward movement of the tabulation control slide rocks bail K and arm F, thus rocking shaft assembly H to lower arms G, I and J.

Lowering of arm I rocks lever Y, raising lever Y. Latch AA releases clutch arm AB which is moved downward by spring AI to engage tabulation clutch members AC and AD through roll AE. As lever Y is rocked downward, arm AH of lever Y contacts lip AG and moves slide assembly AF

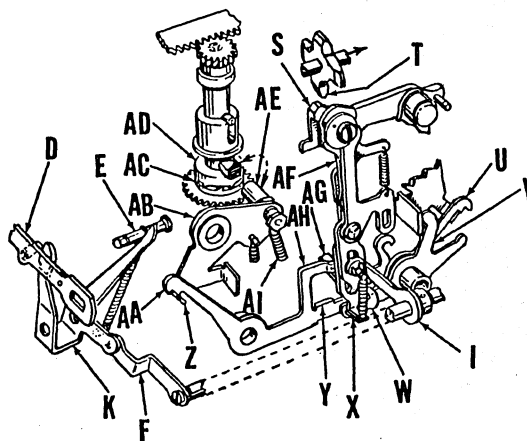


Fig. VI-54

to lower stop bumper S out of the path of stop T. Slide assembly AF is retained in its lower position by lever Y through formed ear Z. As arm I is rocked downward, it also moves slide W downward which, through stud X and lever V, ensure positive resetting of the return clutch assembly by latch U and prevents possible engagement of the tabulation and return clutches at the same time.

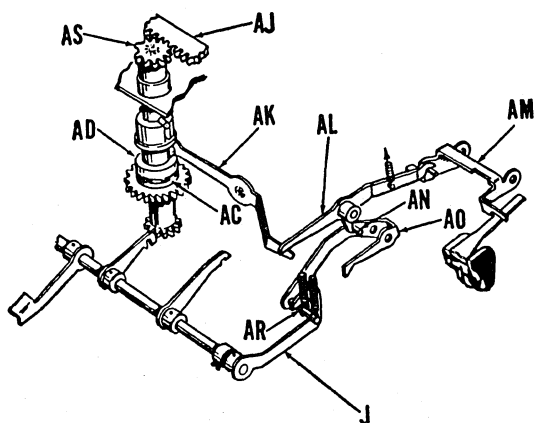


Fig. VI-55

The downward movement of arm J rocks bail AO causing stud AN to cam against the lower projection of lever AL to rock bail AM which closes the motor switch points, thus actuating the motor to tabulate the carriage to the next position through clutch members AC and AD, gear AS, and rack AJ. Lever AK, which is rocked by clutch member AD, holds lever AL to retain the motor switch points closed while the tabulation clutch members are engaged.

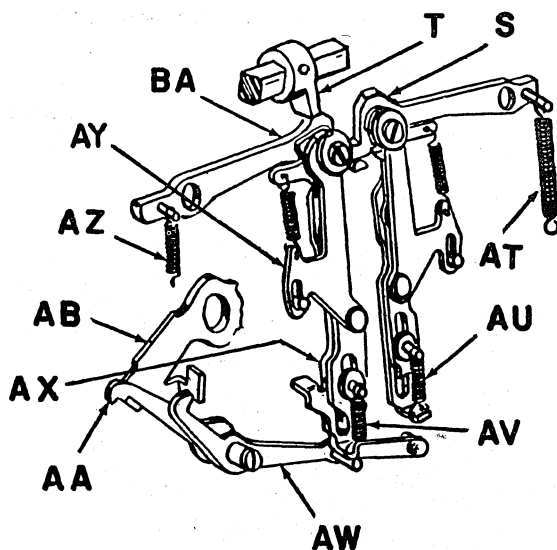


Fig. VI-56

Disengagement of the carriage tabulation mechanism occurs when stop T lowers stop bumper BA which moves slide AX downward through pawl AY, thus rocking bellcrank AW to reset

clutch arm AB on latch AA, thereby disengaging the clutch members and permitting springs AT and AU to locate stop bumper S into the path of stop T to stop the carriage in its new position. Springs AV and AZ return bumper BA to its normal position to retain the carriage in position through stop T.

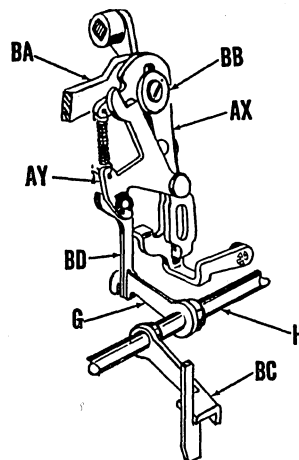


Fig. VI-57

If shaft assembly H is held in its rocked position (by holding the tabulation key depressed or by latching paddle BC for a skip-tabulation operation), arm G, through link BD, holds pawl AY out of the path of collar BB permitting stop bumper BA to idle in the upper slot of slide AX, as carriage stops pass over stop bumper BA, without disengaging the carriage tabulation clutch members.

Return

Carriage return is indexed manually when return key BE is depressed rocking lever BF which, through stud BG, moves return control slide BH rearward.

Carriage return is indexed automatically during the latter portion of a machine cycle when roll N on the main operating camshaft rocks kicker arm O to move return control slide BH rearward through stud BS. Return control slide BH is held in a normally inactive position by spring BQ; however, it may be lowered into an active position in line with stud BS from various sources and when it is, it rocks the tabulation control slide upward to an inactive position through rocker bail BP.

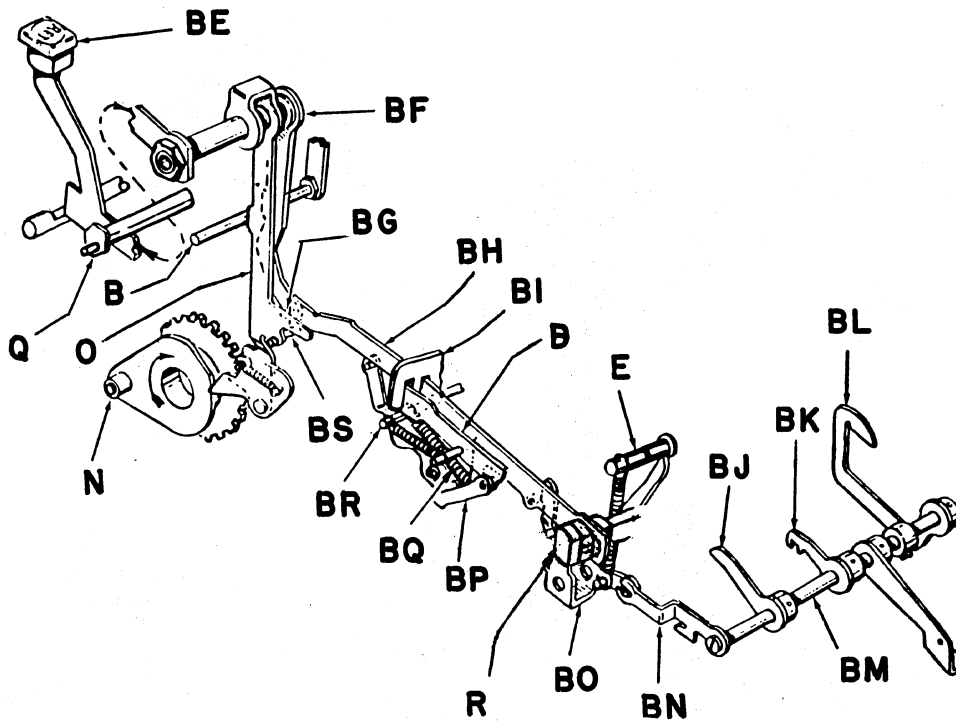


Fig. VI-58

The rearward movement of return control slide BH rocks bail BO and arm BN, thus rocking shaft assembly BM to lower arms BJ, BK and BL.

CA is then retained in its lower position by lever BX through latch BW. As arm BJ is rocked downward, it also moves slide AX downward which, through stud BY and lever AW, ensures positive resetting of the tabulation clutch assembly by latch AA and prevents possible engagement of the return and tabulation clutches at the same time.

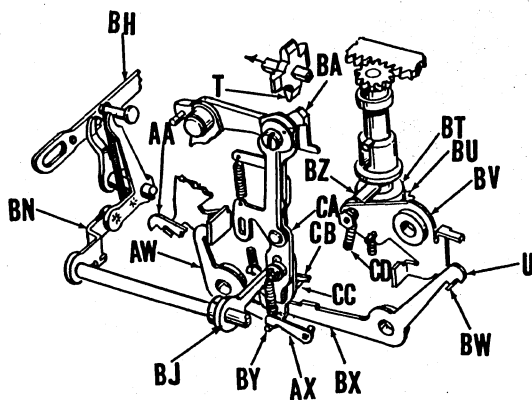


Fig. VI-59

Lowering of arm BJ rocks lever BX to raise latch U releasing clutch arm BV which is moved downward by spring CD to engage return clutch members BT and BU through roll BZ. As lever BX is rocked downward, arm CB contacts lip CC and moves slide assembly CA to lower stop bumper BA out of the path of stop T. Slide assembly

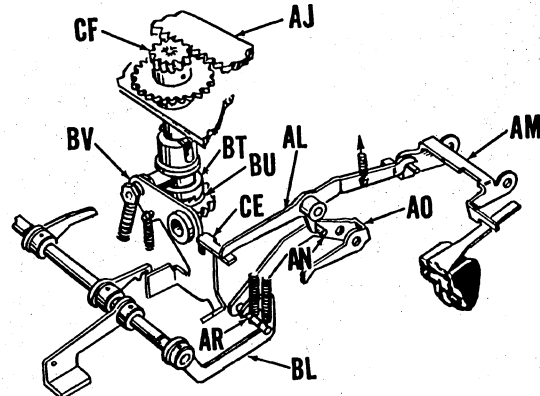


Fig. VI-60

The downward movement of arm BL rocks bail AO causing stud AN to cam against the lower projection of lever AL to rock bail AM which closes the motor switch points, thus, actuating the motor to return the carriage to the next position

through clutch members BT and BU, gear CF, and rack AJ. Lip CE on clutch arm BV holds lever AL to retain the motor switch points closed while the return clutch members are engaged.

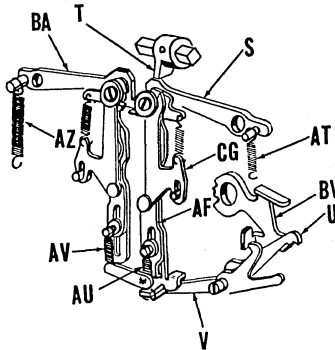


Fig. VI-61

Disengagement of the carriage return mechanism occurs when stop T lowers stop bumper S which moves slide AF downward through pawl CG, thus rocking bellcrank V to reset clutch arm BV on latch U, thereby disengaging the clutch members and permitting springs AZ and AV to locate stop bumper BA into the path of stop T to stop the carriage in its new position. Springs AT and AU return bumper S to its normal position to retain the carriage in position through stop T.

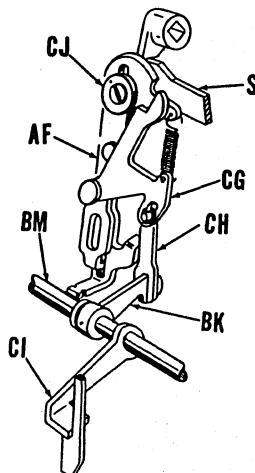


Fig. VI-62

If shaft assembly BM is held in its rocked position (by holding the return key depressed or by latching paddle CI for a skip-return operation), arm BK, through link CH, holds pawl CG out of

the path of collar CJ permitting stop bumper S to idle in the upper slot of slide AF as carriage stops pass over stop bumper S without disengaging the carriage return clutch members.

Latch Prevents Carriage Recoil

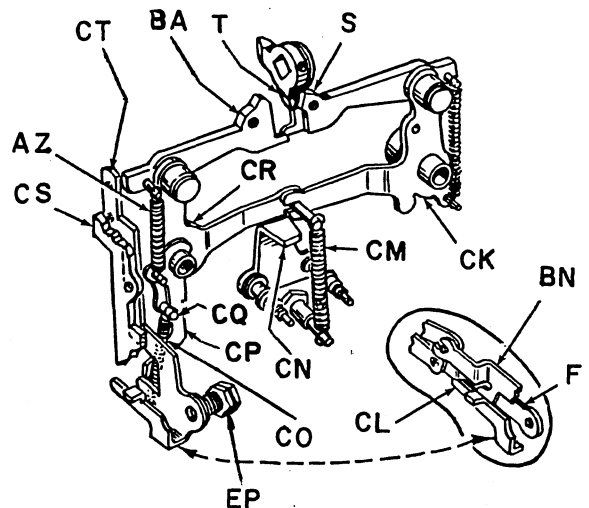


Fig. VI-63

As a stop pulls into position between bumpers, the momentum of the carriage traveling in its selected direction is slowed partly by a brake mechanism; however, to provide additional cushioning effect, the bumpers are allowed to yield laterally, and, through bellcranks CK and CR and spring CM, are brought back to a center position limiting on lip CN of the carriage drive unit back plate.

Recoil from this yielding action is limited by rebound latch CT which is held inactive by arm CP, through spring AZ, until the bumpers are spread by a stop coming into position; at this time, stud CQ rocks arm CP releasing latch CT which then limits on the front surface of the right bumper tail. As the bumper is restored to normal by spring CM, latch CT is pulled by spring CO to position itself between the tail of bumper BA and carriage drive unit sideframe CS, thus blocking any further sideward movement of the bumpers. Latch CT is reset by movement of either arm BN or F which rocks the latch through contact with its projection CL.

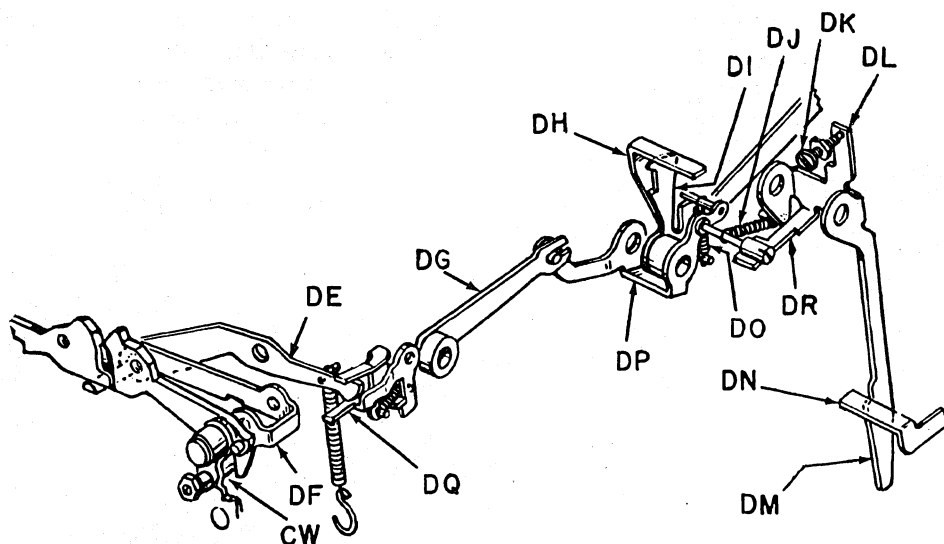


Fig. VI-64

Interlocks Delay Drive Trip

In order to prevent indexing a machine operation until the carriage tabulation or return operation has been completed, a series of interlocking levers are provided to delay the release of the drive trip until the carriage is fully settled in a stop position to align the control unit with the various carriage operated machine controls.

Interlocks DI and DM become active when the stop bumpers are moved out of their normal position by rocking lever DE (directly, from the lowering of the stop bumpers; and through roll CW and arm DF as the bumpers are spread). Lever DE through lever DG, bail DP and springs DO and DJ, positions interlocks DI and DM into the paths of drive trip arm DH and clutch release bail DN, respectively, to delay the tripping of the drive.

During tabulation and return, there is a short interval (prior to the normal overthrowing of the carriage) during which the stop bumpers are normal; however, as the carriage moves into the "overthrow" condition, spreading of the stop bumpers occurs and re-actuates arm DE. Lever DG has a latch DQ which delays the release of the interlocks just enough to take up the interval during which the bumpers are in normal position prior to overthrow.

In later machines DM has been redesigned at the point of contact with DN by having the

cutout for the step in DM made deeper. This made part DQ and the step of DI unnecessary. The earlier machines did not contain DQ, DI with the step nor adjusting screw DK.

Brake Mechanism

A means of dampening carriage movement and minimizing overthrow when the carriage is stopped by a stop bumper is supplied through the brake mechanism.

Brake disc DU is connected to the carriage through gears DS and CF and rack AJ. Springs DW and DX supply the tension to raise brake slide DV and hold brake shoes DT against disc DU when the brake slide is released from its lower position.

When manual tabulation is being indexed, the left bumper linkage is lowered and as bell-crank V is rocked, it contacts the formed ear on slide EF which, through its forward stud, swings latch EA clear of lip EB on the brake slide. As bail AO is being rocked to close the motor switch points, its left projection lowers the brake slide by contacting lip EB and latch EC is allowed to position itself over lip EB, thus holding the brake slide downward. When tabulation is being disengaged, the right bumper linkage is lowered by an incoming stop and lever ED is rocked, raising slide EE which, through its forward stud, swings latch EC clear of lip EB allowing the brake slide

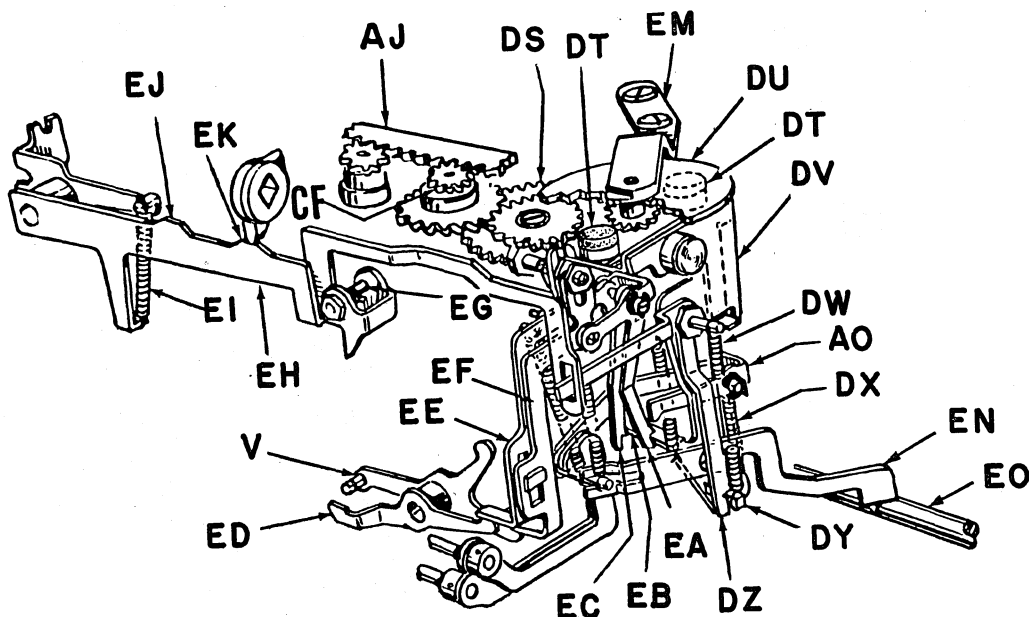


Fig. VI-65

to move upward and limit its square stud DY on latch DZ of the selective brake release mechanism.

On a return operation, the latches, levers and releases of same occur in the opposite order, but again leave the brake slide limiting its square stud on latch DZ of the selective brake release mechanism.

When tabulation or return is indexed during the machine operation, positive resetting of the brake slide is provided by reset lever EN. As adding rack actuating shaft EO moves to its forward position, it rocks the reset lever to reset the brake slide through bail AO, thus removing the load of rocking the switch point lever and resetting the brake slide from the tabulation and return kicker arm.

Selective control of brake application is supplied by brake control lever EH which is constructed with two dwell areas, EJ and EK, along its upper edge. It is under tension of spring EI which restores it to normal position limiting on screw EG. When either dwell is contacted by a carriage stop, the lever is lowered, placing brake latch DZ in position to block square stud DY on the brake slide to prevent brake action until the

proper time.

When carriage stops are spaced at $5/8"$, the outgoing stop, by its contact with one of the dwells on the brake control lever, places brake latch DZ over square stud DY of the brake slide, thus holding the brake inactive. As the incoming stop nears its location between the bumpers, the outgoing stop leaves the outgoing dwell, thus releasing latch DZ and permitting brake engagement.

When the distance between stops is $3/4"$ or more, the incoming stop will be on a dwell on the incoming side after the outgoing stop has left its dwell. Therefore, since the outgoing stop leaves its dwell first, the incoming stop controls the release of the brake slide as it travels down the decline of the dwell on the incoming side. The brake control lever is designed in such a way that brake application will be earlier on the longer carriage movements than on $5/8"$ movements where very little braking action is needed.

Latches EC and EA are necessary so that when the brake slide is reset, it will be held in a reset position until a selected stop activates latch DZ to take over and control the releasing of the brake.

Tests and Adjustments

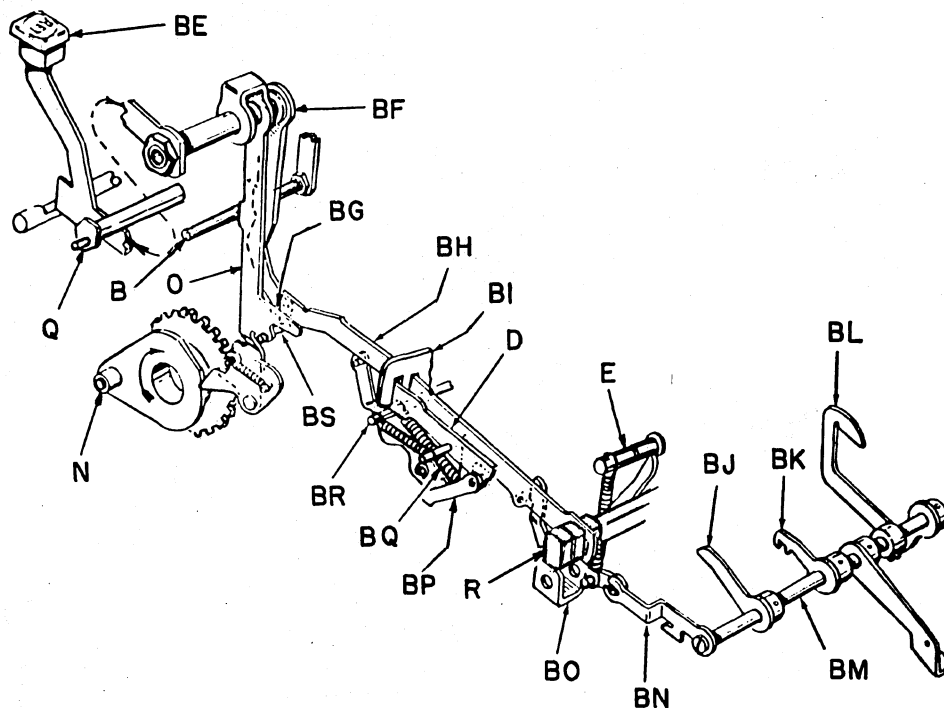


Fig. VI-66

C31-1 With the machine and the kicker arms normal, there should be maximum clearance between the studs in the kicker arms and the control slides.

TO ADJUST, turn the high side of eccentric post B as far forward as possible.

REASON: To prevent interference of the studs in the kicker arms with the control slides.

C31-2 With the machine and the kicker arms normal, there should be .001" to .003" clearance between the lower arm of the tab and return control keys and eccentric post Q.

TO ADJUST, turn eccentric post Q.

REASON: To establish the normal position of the tab and return control keys.

NOTE: On tests C13-27, -28, -29 and C13-30, care should be taken not to distort slotted guide post R when the tab or return slide is actuated to limit against the wire gauge.

C13-17 With return slide BH lowered to limit on stud BR, tab slide D should be raised to the top of the slot in guide comb BI and should be free and not binding.

TO ADJUST, weave arm BP.

NOTE: An over adjustment of arm BP will in-

terfere with the indexing of the return mechanism.

REASON: To ensure indexing and retaining of the carriage return mechanisms and the raising of the tab slide to an inactive position to prevent simultaneous indexing of the tab and return slides.

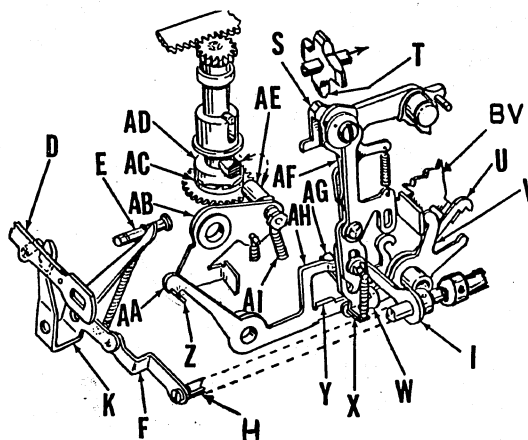


Fig. VI-67

C13-24 With arms K and BO limiting on post E, and return slide BH and tab slide D positioned to the top of their slots in the guide comb, there should be no more than .003" clearance between the fingers of arms K and BO and the studs on the tab and return slides.

TO ADJUST, weave arms K and BO.

REASON: To prevent binding of the tab and return slides and ensure proper indexing from these slides.

C13-27 With the bumpers at normal, insert a .055" guage in the slot in the rear of tab slide D. With the tab slide raised and limiting in the top of the slot in guide comb BI, move the tab slide rearward to limit on the .055" guage. Ear Z should release from the bottom step and latch on the upper step of latch AA. TO ADJUST, bend ear Z as required.

REASON: To establish the timing for the release and meshing of the tab clutch members.

C13-28 With the bumpers at normal, insert a .070" guage in the slot of the tab slide. With the tab slide lowered to limit on spring anchor stud BR and moved rearward to limit on the .070" guage, ear Z should not release from the bottom step of latch AA.

TO ADJUST, recheck test C13-27.

REASON: To prevent a premature meshing of the tab clutch members.

C13-29 With the bumpers at normal, insert a .055" guage in the slot in the rear of return slide BH. With the return slide raised and limiting in the top of the slot in guide comb BI move the return slide rearward to limit on the .055" guage. Ear of BV should release from the bottom step and latch on the upper step of latch U.

TO ADJUST, bend ear of BV as required.

REASON: To establish the timing for the release and meshing of the return clutch members.

C13-30 With the bumpers at normal, insert a .070" guage in the slot of the return slide. With the return slide lowered to limit on spring anchor stud BR and moved rearward to limit on the .070" guage, ear of BV should not release from the bottom step of latch U.

TO ADJUST, recheck test C13-29.

REASON: To prevent a premature meshing of the return clutch members.

C13-22 Tab and return shafts H and BM must be free with no more than .003" end play.

TO ADJUST, move the set collars provided, toward or away from the left sideframe of the gear box as required, with the screws facing to the rear and downward.

REASON: To ensure freedom of the shafts and retain the tab and return paddles in correct relation to the skip and return latches.

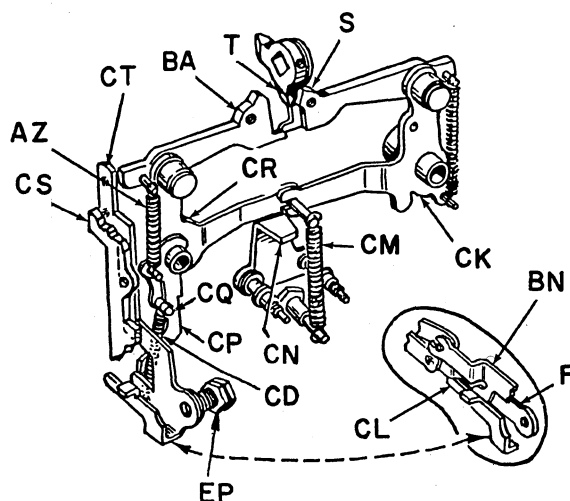


Fig. VI-68

C13-42 With bumpers spread, recoil blocking arm CT should be released, and freely move into path of projection on right bumper, when bumpers are restored to normal.

TO ADJUST, set collar on tab shaft H as required so that tab shaft shall be free and have no more than .003" side play.

REASON: To ensure recoil blocking arm CT moving into path of projection on right bumper after sensing unit has been secured to gear box.

C13-23 Rebound latch CT should have .003" to .005" side play on the tab shaft.

TO ADJUST, turn nut EP toward or away from the tab paddle as required.

REASON: To ensure the free movement of the rebound latch into the path of the right bumper.

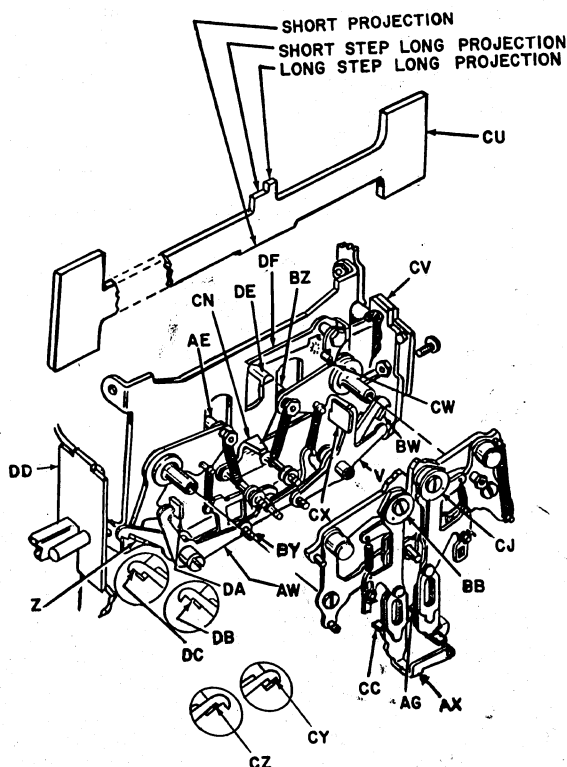


Fig. VI-69

C13-2 With the clutch teeth of tab gears AC and AD positioned point to point, there should be .055" to .060" clearance at point DC.

TO ADJUST, starting with the high side at 9 o'clock, (facing the rear of the machine) turn eccentric AE.

REASON: To provide depth mesh for the clutch teeth when gears AC and AD engage, and run-

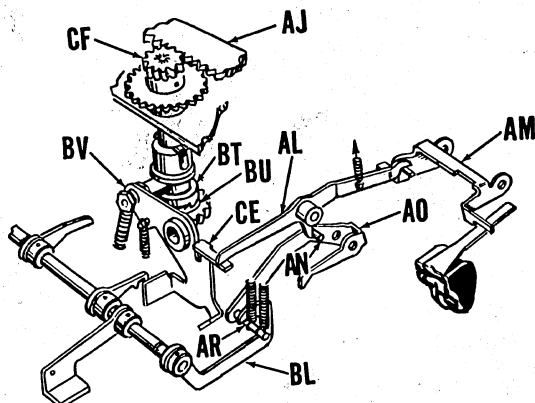


Fig. VI-70

ning clearance for the teeth with the gears at normal.

C13-3 With the clutch teeth of return gears BT and BU positioned point to point, there should be .055" to .060" clearance at point CY.

TO ADJUST, starting with the high side toward 3 o'clock, (facing the rear of the machine) turn eccentric BZ.

REASON: To provide depth mesh for the clutch teeth when the gears engage and running clearance for the teeth with the gears at normal.

C13-18 Engage the return clutch and set gauge CU on height blocks CV and DD with the short projection down. The high point of the left bumper should just contact the short projection of the gauge.

TO ADJUST, turn eccentric bushing CJ, keeping the dot on the bushing to the 9 o'clock side, (facing the rear of the machine).

REASON: To establish the normal position of the left bumper.

C13-19 With the bumpers at normal and eccentric roller CW positioned to not interfere with stud DE limiting on the tail of the left bumper, there should be no lost motion between the tail of the right bumper and stud DE.

TO ADJUST, turn eccentric bushing BB, keeping the dot on the bushing to the 3 o'clock side, (facing the rear of the machine).

REASON: To establish the normal position of the right bumper.

C13-20 With a stop dog positioned between the right and left bumpers, there should be .003" to .005" clearance between the stop dog and the bumpers.

TO ADJUST, bend limit CN.

REASON: To permit the right and left bumpers and drive trip interlocks to restore to normal.

C13-21 With the bumpers at normal, there should be no lost motion of lever DF between stud DE and eccentric roller CW.

TO ADJUST, turn eccentric roller CW.

NOTE: The screw end of eccentric roller CW is not to extend beyond the face of the lock nut.

REASON: To ensure immediate movement of the drive trip interlocks as bumpers are spread during tab or return operations.

C13-25 Set gauge CU on height blocks CV and DD with the high step of the long projection over the high point of the left bumper. With

the gauge pressed down so that both ends limit on the height blocks, there should be .013" to .018" reset clearance at point CZ.

NOTE: This should result in a range from .008" to .028" clearance with any stop dog positioned over the bumper.

TO ADJUST, bend formed ear CX, or on machines having studs instead of ears, bend the formed ear on part V.

REASON: To ensure latching the return clutch in an inactive position.

C13-26 Set gauge CU on height blocks CV and DD with the high step of the long projection over the high point of the right bumper. With the gauge pressed down so that both ends limit on the height blocks, there should be .013" to .018" reset clearance at point DB.

NOTE: This should result in a range of from .008" to .028" clearance with any stop dog positioned over the bumper.

TO ADJUST, bend formed ear DA, or on machines having studs instead of ears, bend the formed ear on part AW.

REASON: To ensure latching the tab clutch in an inactive position.

C13-31 With the left bumper latched down, and gauge CU set on height blocks CV and DD with its long projection down, the high point of the bumper should just contact the short step on the long projection of the gauge.

TO ADJUST, bend lip CC as required.

REASON: To establish the proper latched down height of the left bumper.

C13-32 With the left bumper latched down, stud X should be free and not bind on the ear of auxiliary slide W.

TO ADJUST, recheck tests C13-25 and C13-31.

REASON: To eliminate excessive upward pressure on the bumper when in a latched position.

C13-33 With the right bumper latched down, and gauge CU set on height blocks CV and DD with its long projection down, the high point of the right bumper should just contact the short step on the long projection of the gauge.

TO ADJUST, bend lip AG as required.

REASON: To establish the proper latched down height of the right bumper.

C13-34 With the right bumper latched down, stud BY should be free and not bind on the ear

of auxiliary slide AX.

TO ADJUST, recheck tests C13-26 and C13-33.

REASON: To eliminate excessive upward pressure on the bumper when in a latched position.

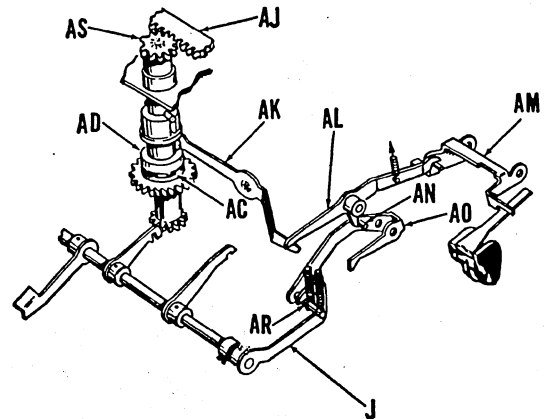


Fig. VI-71

C13-39 With the bumpers normal and stud AR limiting on the upper surface of arms BL and J, and with the lower projection of arm AL limiting on stud AN, there should be a simultaneous contact of arm AL on formed ear CE and arm AK.

TO ADJUST, bend formed ear CE and/or arm AK. If necessary, bend arm AL.

REASON: To ensure holding motor switch points closed during carriage tabulation and return operations.

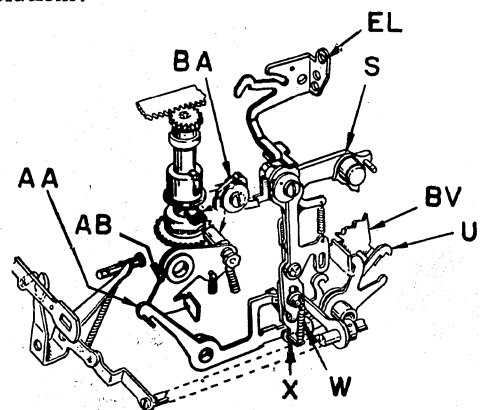


Fig. VI-72

C12-19 With the carriage in its extreme right and left positions, there should be .010" to .015" latching lead between levers AB and the latch step of latches AA.

TO ADJUST, bend the lower projections of

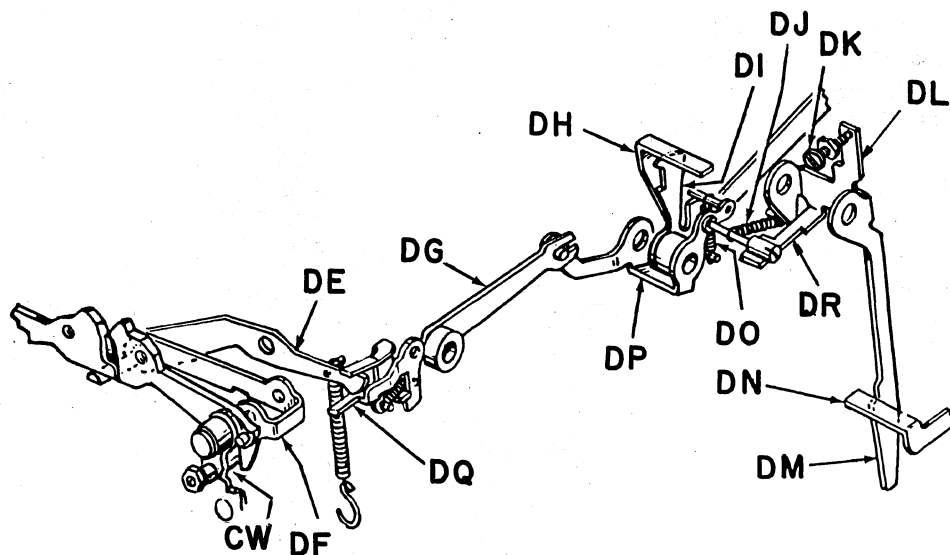


Fig. VI-73

latches EL as required.

REASON: To ensure disengagement of the tabulation and return clutches at the ends of the carriage.

C12-20 With the carriage in its extreme right or left end position, there should be no less than .010" side clearance between the lower projection of latches EL and bumper BA or S.

TO ADJUST, bend the lower projections of latches EL in or out as required.

REASON: To permit free engagement of the tabulation or return clutches when the carriage is in the end positions.

C12-21 The carriage should detent securely in the end positions and should release without hesitation on snap operations of the tab and return keys.

TO ADJUST, bend the upper projections of limit stops EL up or down as required.

NOTE: After making the above adjustment, recheck tests C12-19 and C12-20.

REASON: To retain the carriage in the end positions for the selection of the schedules and the removal of the control unit.

P11-6 With the machine and bumpers normal partially depress and hold error key and depress MB2, slowly restore drive with error key until the ear of arm DH is raised parallel to the top of interlock DL. At this point there should be .005" to .010" clearance between the front edge of arm DH and the rear edge of interlock DL.

NOTE: Projection DR of bail DM must be bent downward to avoid a false limit, to correctly make this adjustment.

TO ADJUST, bend rear lip of lever DG up or down as required.

REASON: To ensure delaying the drive trip until the carriage is fully settled in a stop position.

P11-7 With the machine and bumpers normal, depress motor bar No. 2 and cycle the machine until the ear of DN is raised parallel to the corner of the step of interlock bail DM. At this point, there should be .005" to .010" clearance between the front edge of bail DN and the rear edge of bail DM.

TO ADJUST, bend projection DR of bail DM at point of contact with screw in DP.

NOTE: In making this adjustment, check projection DL of bail DM for not getting a false limit on screw DK.

REASON: To ensure correct timing of the interlocks to delay drive trip.

P11-9 With the machine and bumpers normal, there should be .003" to .005" clearance between projection DL and limit screw DK.

TO ADJUST, turn screw DK in or out as required and lock in place with the lock nut.

REASON: To limit the overthrow of interlock bail DM.

NOTE: In machines which do not contain screw DK bend DL to limit on crossmember of machine.

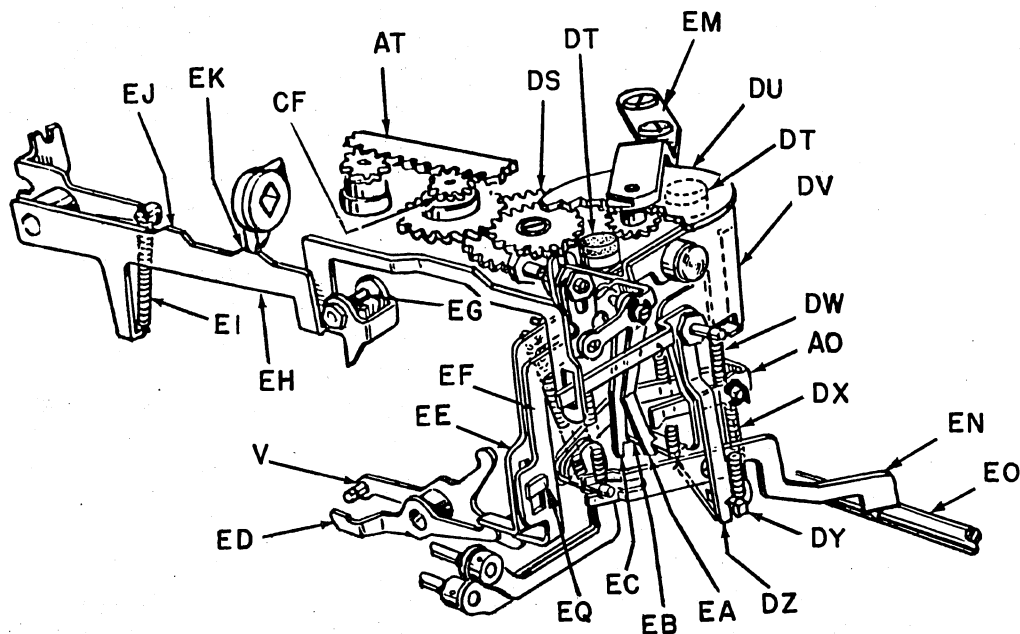


Fig. VI-74

In machines containing latch DQ there should be .003" clearance between lip of DG and DQ with the machine at normal.

TO ADJUST, bend DQ for earlier or later contact with DG.

C13-4 Brake plate DU should rotate freely and have no more than .005" vertical play.

TO ADJUST, remove brace EM and bend at offset.

REASON: To ensure free rotation of the brake plate and to have proper pressure when the brake is applied.

C13-35 With the bumpers at normal and the brake latched in an inactive position, there should be .015" to .025" clearance between the ear of slide EE and lever ED.

TO ADJUST, bend the ear of slide EE up or down.

REASON: To prevent a bind of slide EE against post EQ when the right bumper is depressed by a stop dog.

C13-36 With the bumpers at normal and the brake latched in an inactive position, there should be .015" to .025" clearance between the ear of slide EF and lever V.

TO ADJUST, bend the ear of slide EF up or down.

REASON: To prevent a bind of slide EF against

post EQ when the left bumper is depressed by a stop dog.

C13-37 With the brake latched on latches EA and EC, auxiliary latch DZ should have .005" to .010" latching lead over square stud DY.

TO ADJUST, bend the lower arm of auxiliary latch DZ at its offset.

REASON: To permit free entry of auxiliary latch DZ over square stud DY.

C13-38 With latches EA and EC released and arm EH at its upward limit against screw EG, there should be .010" to .015" passing clearance of square stud DY past auxiliary latch DZ. TO ADJUST, bend the upper arm of auxiliary latch DZ up or down as required.

REASON: To ensure engaging and releasing of auxiliary latch DZ during 5/8" tab or return operations of the carriage.

C13-41 Manually cycle the machine until the forked end of brake resetting arm EN has reached its lowest limit. The steps of latches EA and EC should have at least .015" latching lead over formed ear EB of the brake slide.

TO ADJUST, weave bail AO.

REASON: To permit free entry of latches EA and EC over formed ear EB of the brake slide, when the brake is cammed downward by bail AO.

SELECTIVE CARRIAGE TABULATION AND RETURN AND RELATED FUNCTIONS

The Sensimatic machine is designed to basically tabulate the machine to the next right hand stop position when the machine is cycled with the carriage controls active. The basic function may be changed with carriage controls, from motor bars, or from carriage controls in conjunction with motor bars to provide selective carriage movements. Carriage control lanes 1 through 5 are used to control tabulation and return of the carriage so that stops may be bypassed or skipped.

Selective carriage movement consists of basic carriage movement plus controls to retain the tabulation and return clutch mechanisms engaged until the carriage arrives at a selected stop position. Prior to the selected stop position, carriage controls will permit the tabulation or return clutch members to be disengaged; thereby

causing the carriage to stop at the next stop position.

The various selective carriage movements are indexed from carriage controls and/or motor bars. The basic functions of the individual carriage controls and motor bars are covered separately so that when two or more controls are functioning at the same time, the carriage movement obtained is better understood.

In addition to lanes 1 through 5, other carriage controls are used in conjunction with the motor bars to provide the variety of carriage movements are: motor bar repeat (MBR); disable space (DS); disable space and return (DSR); repeat of machine operation (REPT); and repeat of machine operation and repeat of keyboard (REPT KB).

The chart below illustrates the carriage movements that may be obtained from the various combinations of carriage controls and motor bars.

When the machine is operated from ---	and the active carriage controls are ---	the resulting carriage movement is ---
Motor Bar No. 2 Subtract Keys, Total and Subtotal Keys, Rept or Rept KB	None	basic tabulation to the next righthand stop
	short projection in lane 4	tabulation with lane 4 control
	short projection in lane 5	return with lane 5 control
Motor Bar No. 1 or Repeat of Motor Bar No. 1 - MBR	None	return with lane 2 control
	short projection in lane 3	return one stop without using a lane of control
	5 pin in lane 15 (DSR)	tabulation with lane 1 control
	5 pin in lane 15 (DSR) and a short projection in lane 3	tabulation with lane 3 control
Motor Bar No. 4	None	tabulation with lane 1 control
Motor Bar No. 3	None	None

Fig. VI-75

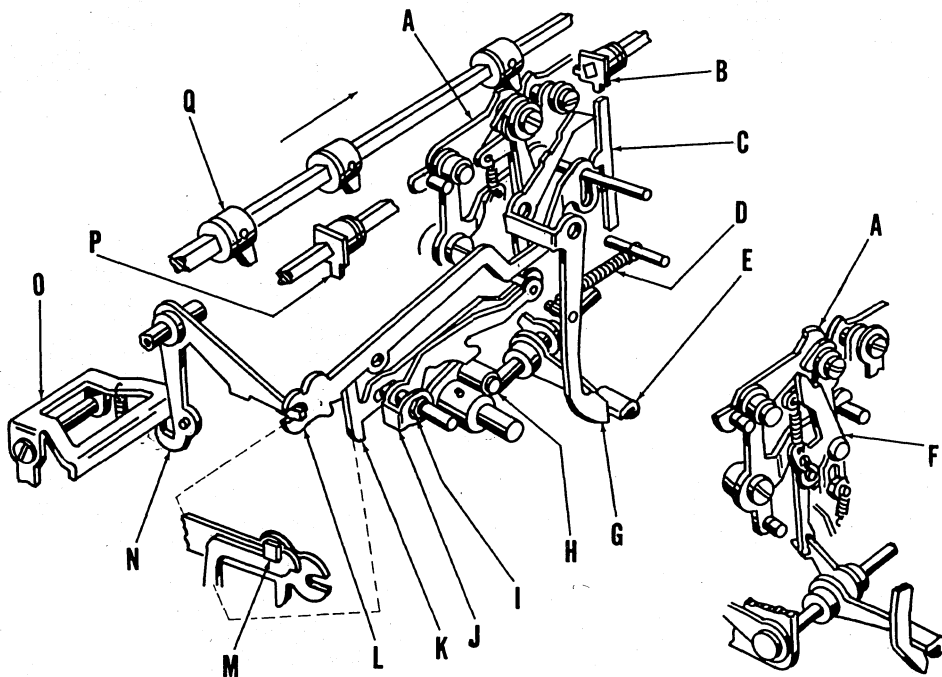


Fig. VI-76

Lanes 1, 3 and 4 provide selective tabulation and lanes 2 and 5 provide selective return. Lanes 1 and 2 may be indexed completely from motor bars. Lane 3 is partially indexed by a motor bar and partially indexed by carriage control. Lanes 4 and 5 are completely indexed by carriage controls during the machine cycle.

Lane 4 - Selective Tabulation

Selective tabulation, using lane four control, is provided during a machine operation indexed by motor bar No. 2 or its equivalent. The tab clutch is engaged as described earlier; i.e., through the kicker arm and tab control slide on the right side of the Carriage Drive Unit. Lane four control of carriage tabulation is indexed by a short projection in lane four to hold the tab clutch engaged until the carriage arrives at the selected stop position. A long projection releases lane four control to permit the tab clutch to be disengaged and stop the carriage in the selected stop position.

Early in a machine cycle in which a short projection is active in lane four, roll H on the

sensing camshaft raises sensing lever L and tapet C to sense short projection B and rock lane four bellcrank N. Upward movement of the sensing lever raises square stud M above the hook of link K. The square stud and sensing lever are held in raised position by latch plate O. Near the middle of the machine cycle, the main camshaft rocks the kicker arm to move the tab control slide rearward to engage the tabulation clutch and raise paddle E. Upward movement of the paddle permits spring D to move latch G underneath the paddle, since stud M is held above link K by the latch plate. As long as the latch holds the paddle in its raised position, pawl F is held out from under the eccentric collar on bumper A, permitting stops to pass over the bumper without disengaging the tab clutch. As the step of latch G moves under the paddle, the cam surface on the top of the latch is raised into the path of a long projection in lane four.

Prior to the selected stop position, long projection P in lane four contacts and releases latch G from the paddle. As the paddle shaft restores to normal, pawl F moves back under the eccentric collar of stop bumper A. Then as selected

stop Q moves over the bumper the tab clutch is disengaged causing the carriage to stop. Paddle E moving downward cams latch G to the right to position the hook of link K clear of square stud M so that the sensing lever may restore to normal.

The limitations concerning the positioning of long projections in lanes one through five were mentioned under a previous subject and should be reviewed at this time in regards to function and construction.

The long projection should precede the selected stop position by at least $1/8$ of an inch. This limitation provides time for pawl F to reposition under the eccentric collar of the stop bumper after latch G has been released and before the selected stop starts to depress the bumper.

The long projection should follow the indexing stop position by at least $1/2$ inch. This limitation provides time for the control slide on the side of the Carriage Drive Unit to restore to normal and permit the lane of control to latch the paddle before the long projection has moved past the cam surface of the lane of control latch.

When an overlapping skip or overlapping return condition exists, the first long projection should be located approximately $1/8$ " beyond the second indexing stop position.

The long projection would then be located between the tappet and the cam surface of the lane of control latch when the carriage is at the second indexing stop position. Therefore, when the lane of control is indexed at the second stop position the long projection will move away and not release the latch, permitting the carriage to move to the second selected stop position.

Lane 5 - Selective Return

Selective return, using lane five control, is provided by a short projection in lane five when the machine operation results from depression of motor bar No. 2 or its equivalent. Since the carriage will normally tabulate, the short projection in lane five must lower the return control slide into the path of the kicker arm as well as provide a latch in lane five to hold the return clutch engaged until the carriage arrives at the selected stop position.

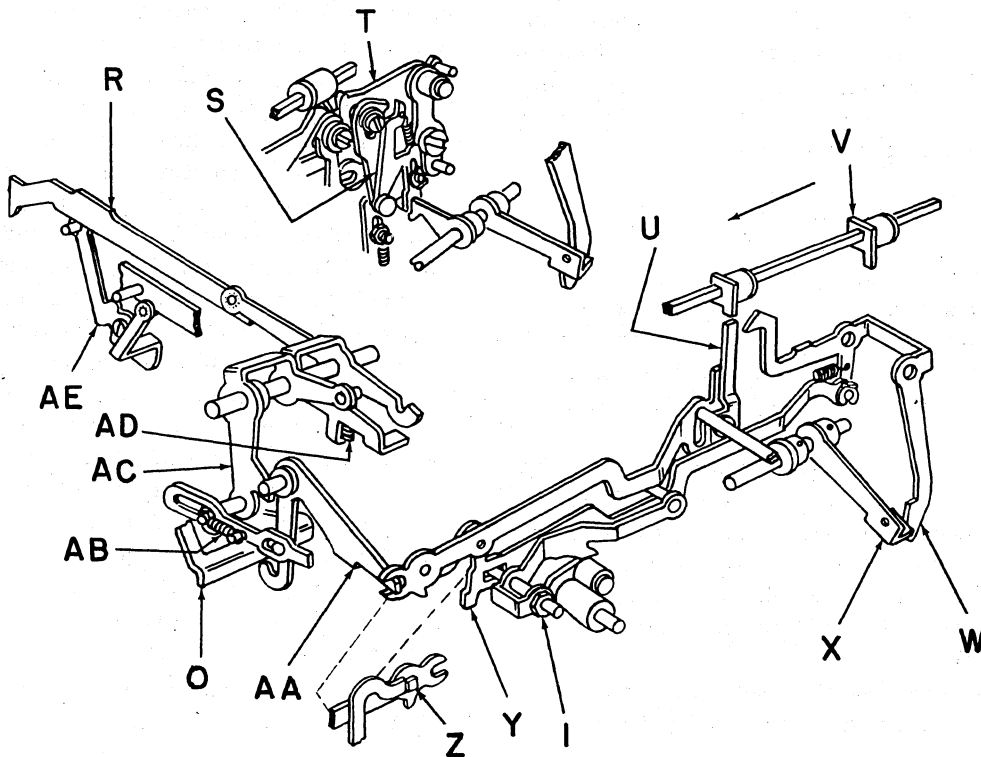


Fig. VI-77

Early in the machine cycle when tappet U senses a short projection in lane five, square stud Z on the sensing lever is raised above the end of link Y, thereby opening or indexing lane five control. Latch plate O will retain the lane of control indexed until the carriage movement is indexed.

When the carriage control lever is in its forward position, the tabulation control slide on the side of the Carriage Drive Unit is normally in active or lowered position and the return control slide is in inactive or raised position; therefore, the short projection in lane five must reverse the positions of the tab and return slides so that the return clutch may be engaged during the machine cycle. Lane five sensing lever, moving upward, rocks bellcrank AA to lower return control slide R into the path of the kicker arm through bail assembly AC. The return control slide, moving downward, rocks lever AE to raise the tabulation control slide and prevent simultaneous indexing of the tabulation and return control slides.

Near the middle of the machine cycle the kicker arm is actuated by the main camshaft to move the return control slide rearward, engaging the return clutch. As the return paddle shaft rocks, paddle X is raised above the step of lane five latch W, permitting the latch to move under

the paddle and hold the return clutch engaged. As long as the paddle is held in raised position, pawl S is held out from under the eccentric collar of stop bumper T, without disengaging the return clutch.

Before the carriage arrives at the selected stop position, long projection V in lane five contacts the upper cam surface of latch W and rocks the latch to release the paddle. As the paddle restores to normal, pawl S moves under the eccentric collar of the bumper so that the selected stop, passing over the bumper, disengages the return clutch causing the carriage to stop. The paddle also fully restores latch W and link Y to the left to permit lane five sensing lever to restore.

The square stud on the lane five sensing lever prevents latch W from becoming active when the return clutch is engaged and lane five control is not desired.

Springs AD and AB are yielding connections in the linkage that will permit other controls to take precedence over a short projection in lane five, providing for alternate carriage movements.

Lane 2 - Selective Return

Selective return, using lane two control, is

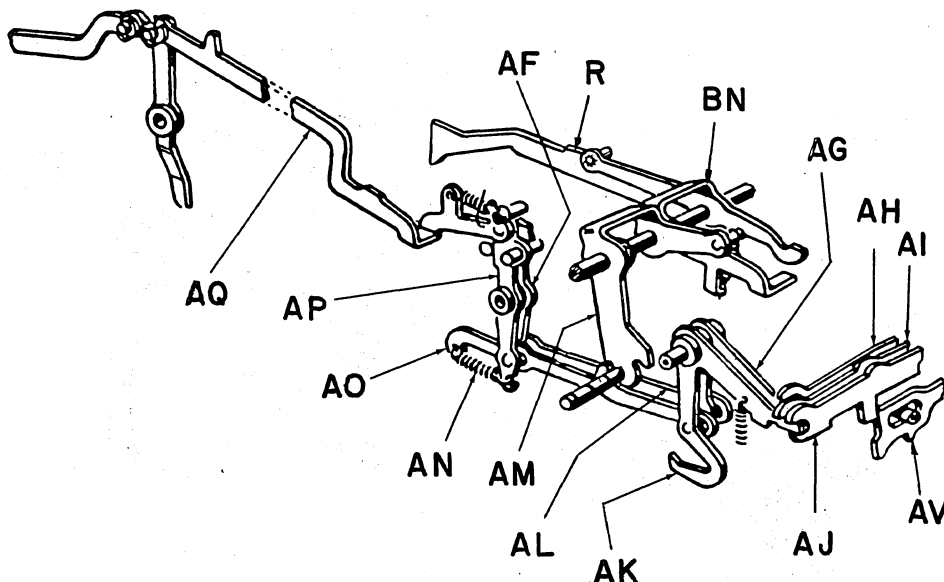


Fig. VI-78

indexed by motor bar No. 1 and released by a long projection in lane two preceding the selected stop position.

Basic functions of motor bar No. 1 are indexed anytime motor bar No. 1 is depressed; therefore, those functions should be considered to fully understand selective tabulation and return.

Depression of motor bar No. 1 will provide the following functions: index spacing; index return; index or open lanes one, two and part of three; disable tabulation; block lanes four and five; permit lane 15 to be active; disable repeat machine operation or repeat keyboard and machine operation (lane 21); and trip the drive. Since the return clutch will be engaged and lane two is the only return lane of control open, the carriage returns, using lane two control and spacing will occur during the machine cycle.

As motor bar No. 1 is depressed, linkage AQ is moved forward to rock lever AP and move link AO rearward. The projection on link AO rocks bail assembly AM to lower the return control slide into the path of the kicker arm. Link AO moving rearward also rocks bellcrank AK to raise levers AJ and AI above their corresponding latching links, opening lane two and partially opening lane three. The stud in lever AP rocks bellcrank AG, through lever AF and link AL, to raise lever

AH and open lane one. Spring AN provides a yielding connection in the linkage that permits the return function to be disabled from other controls during the machine cycle.

Near the middle of the machine cycle, the kicker arm is actuated by the main camshaft to move the return control slide rearward, engaging the return clutch. Rocking the return paddle shaft permits lane two latch AU to be moved under the return paddle by spring tension, since lane two was opened from depression of motor bar No. 1. As long as lane two latch AU holds the paddle shaft rocked, pawl AR is held out from under bumper AS, permitting stops to pass over the bumper without disengaging the return clutch. Prior to the selected stop position, long projection AT in lane two disengages latch AU from the return paddle. As the paddle shaft restores to normal, pawl AR moves under the bumper so that the selected stop, passing over the bumper, disengages the return clutch, causing the carriage to stop.

The spacing function is indexed as previously described under the spacing subject.

When return control slide R is lowered into the path of the kicker arm, tabulation control slide BD is raised through lever BC to disable tabulation.

Lanes four and five are blocked when link

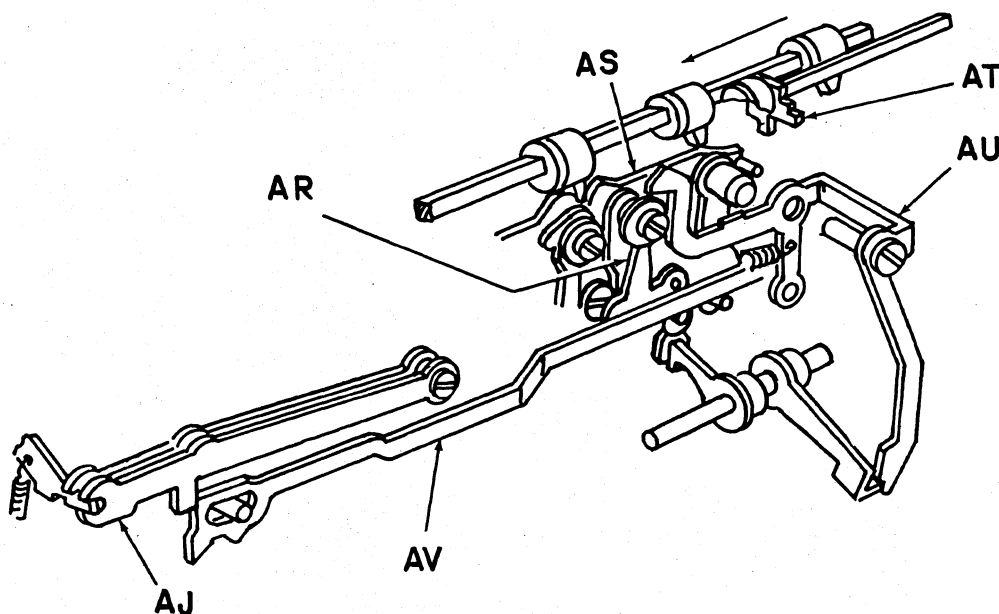


Fig. VI-79

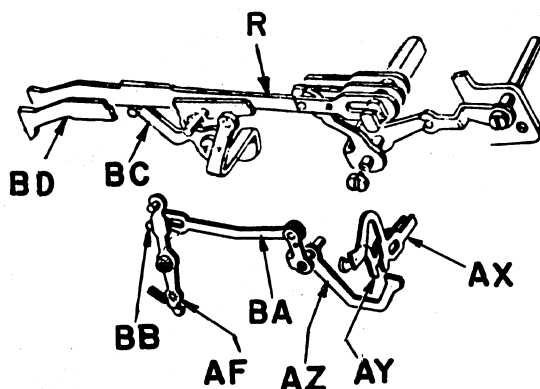


Fig. VI-80

AY on lane four latch and link AX on lane five latch are prevented from moving to the left and right respectively. As lever AF is rocked, from the depression of motor bar No. 1, it contacts stud BB, moving link BA forward to rock lever AZ up into position to block links AY and AX.

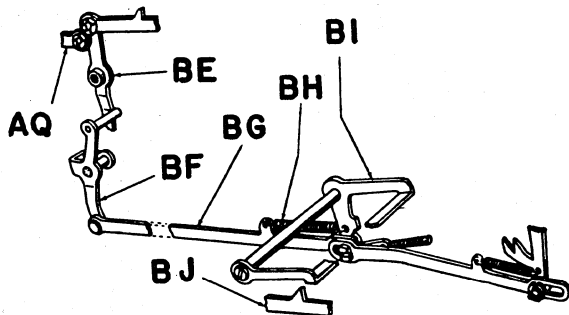


Fig. VI-81

When motor bar No. 1 is depressed, lane 21 is disabled even though it may have a control pin active. As linkage AQ moves forward during depression of motor bar No. 1, lever BE rocks lever BF to pull link BG forward and, through spring BH, lower bail BI behind the projection on lane 21 link BJ. This prevents link BJ from being moved rearward by a control pin in lane 21, thus preventing repeat machine operation or repeat keyboard and machine operation.

Disable Space or Disable Space and Return -
DS/DSR - Lane 15

When motor bar No. 1 or No. 4 is depressed, lane 15 is permitted to be active. A control pin in lane 15 can then disable the space mechanism

or the space and return mechanisms and also enable repeat machine operation or repeat keyboard and machine operation (lane 21).

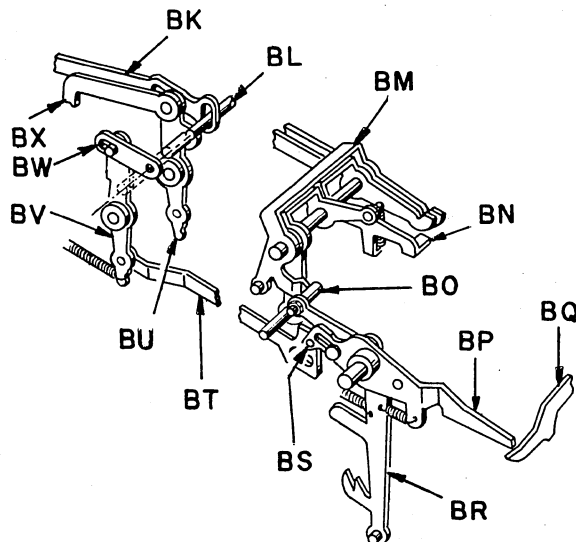


Fig. VI-82

Lane 15 is partially indexed or permitted to function when motor bar No. 1 or No. 4 is depressed. Depression of motor bar No. 1 moves slide BT rearward through link BX, lever BU and lever BV. Depression of motor bar No. 4 moves slide BT rearward through link BK, stud BL, link BW and lever BV. Slide BT moving rearward contacts stud BS and positions slide BP over lane 15 sensing lever BQ. This permits a control pin in lane 15 to rock bellcrank BR during the machine cycle.

When spacing is indexed, bail BM is rocked to lower the space control slide into the path of the kicker arm. Spacing is disabled when a No. 7 control pin in lane 15 rocks bellcrank BR causing roll BO to rock bail BM so that the space control slide may be raised out of the path of the kicker arm by spring tension.

When carriage return is indexed, bail assembly BN lowers the return control slide into the path of the kicker arm. Space and return functions are both disabled when a No. 5 control pin in lane 15 rocks bellcrank BR. Since a No. 5 control pin is longer than a No. 7 control pin, the spacing functions will be disabled as previously described. The No. 5 control pin provides additional movement to bellcrank BR that causes

roll BO to rock bail assembly BN, permitting the return control slide to raise out of the path of the kicker arm.

When a control pin is active in lane 15 but motor bar No. 1 or No. 4 is not depressed, movement is not imparted to lane 15 bellcrank.

On earlier machines, lane 15 bellcrank was blocked by a slide similar to slide BT, when a control pin was active in lane 15 without motor bar No. 1 or No. 4 begin depressed. This caused

a yielding connection on the lane 15 bellcrank to expand.

When lane 21 is disabled by bail BI, rocking lane 15 bellcrank during the machine cycle causes spring BY to pull link BZ rearward to raise bail BI clear of the projection on lane 21 link BJ. This permits a control pin in lane 21 to repeat machine operation or repeat keyboard and machine operation when motor bar No. 1 or No. 4 is depressed.

Lane 1 - Selective Tabulation - Indexed by Motor Bar No. 1 and DSR

Much of the flexibility in carriage movement is provided by the basic functions of motor bar No. 1 in conjunction with carriage controls. When motor bar No. 1 is depressed, the basic functions of the motor bar (as described previously) are provided. After the machine cycle is started, carriage controls can reverse or change some of these basic functions to produce different results.

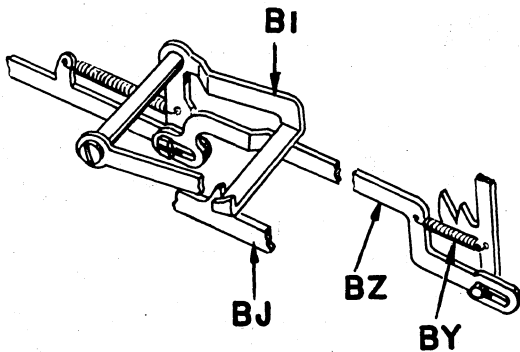


Fig. VI-83

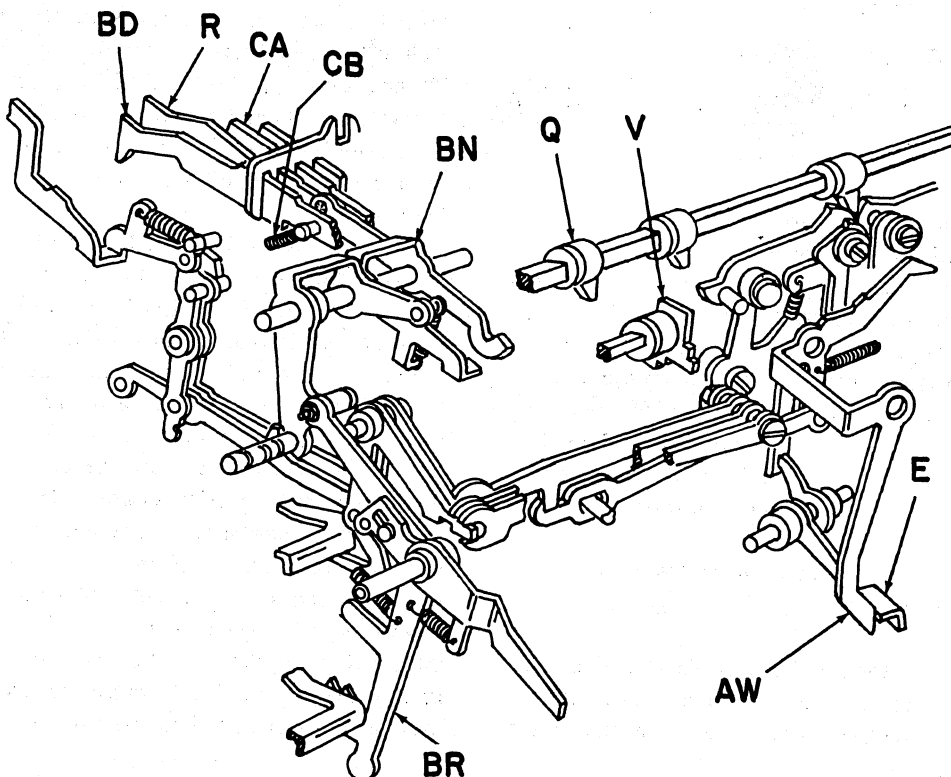


Fig. VI-84

Motor bar No. 1 in conjunction with a No. 5 control pin in lane 15 provides selective tabulation, without spacing, using lane 1 control and lane 21 will be permitted to function. If motor bar No. 1 is depressed in conjunction with a No. 7 control pin in lane 15, the carriage returns using lane 2 control, lane 21 is permitted to be active, but spacing is disabled.

When motor bar No. 1 is depressed, the return and space control slides are lowered into the path of the kicker arm, lanes 1, 2 and part of 3 are indexed or opened and lane 21 (Rept. or Rept. KB) is blocked.

Early in the machine cycle, a No. 5 control pin in lane 15 rocks bellcrank BR to raise return control slide R and space control slide CA before the kicker arm moves rearward. When the return control slide is raised, spring CB lowers tabulation control slide BD into the path of the kicker arm. Near the middle of the machine cycle, the kicker arm moves the tabulation control slide rearward to engage the tab clutch. Since lane 1 is the only tabulation lane of control open, lane 1 latch AW moves under tab paddle E to retain the tab clutch engaged until the carriage arrives at the selected stop position. As the carriage moves, long projection V in lane 1, preceding the selected stop position, rocks latch AW to release the paddle. Selected stop Q moving over the stop bumper disengages the tab clutch causing the carriage to stop in the selected stop position. Thus, the carriage tabulates, using lane one control, and the platen non-spaces.

When a No. 7 control pin is active in lane 15 in conjunction with motor bar No. 1, the No. 7 control pin, being shorter than a No. 5 control pin, disables spacing only and the carriage returns using lane 2 control.

Lane 21 is permitted to be active when lane 15 is actuated by either a No. 5 or No. 7 control pin in conjunction with motor bar No. 1.

Lanes 4 and 5 are blocked as a basic function of motor bar No. 1.

Lane 3 - Selective Tabulation - Indexed by Motor Bar No. 1, DSR and Lane 3 Control

Selective tabulation using lane 3 control, is provided when motor bar No. 1 is depressed, a

No. 5 control pin is active in lane 15 and a short projection is active in lane 3.

Any time motor bar No. 1 is depressed, the basic functions of the motor bar are indexed. During the machine cycle a No. 5 control pin in lane 15 and a short projection in lane 3 index functions that take precedence over the basic motor bar functions. Thus, the carriage tabulates, lane 3 control retains the tab clutch engaged until the carriage arrives at the selected stop position and lane 21 (Rept. or Rept. KB) is enabled.

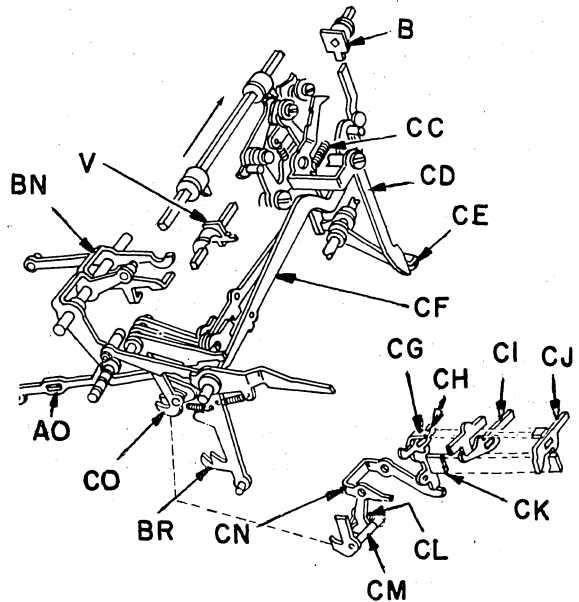


Fig. VI-85

Depression of motor bar No. 1 indexes or opens lanes 1, 2 and part of 3 and lowers the return control slide into the path of the kicker arm through link AO.

Early in the machine cycle, short projection B in lane 3 causes lane 3 sensing lever CF to be raised through the Carriage Control Sensing Unit. Lane 3 sensing lever rocks bellcrank CO causing stud CM, spring CL and bail CN to raise slide CG. Upward movement of the slide raises the upper formed ear of the slide out of the path of lane 3 latch link CI to complete the indexing or opening of lane 3.

When slide CG is raised, projection CK is raised into the path of the projections on the bottom of lane 1 latching link CH and lane 2 latching link CJ. This blocks and prevents lanes one

and two from becoming active during the machine cycle even though lanes one and two are opened when motor bar No. 1 is depressed.

Later in the machine cycle a No. 5 control pin rocks lane 15 bellcrank BR to permit the return control slide to raise and the tab control slide to lower into the path of the kicker arm. Lane 21 is also enabled when lane 15 is active.

When tabulation is indexed during the machine cycle, tab paddle CE is raised, permitting the step of lane 3 latch CD to be positioned under the paddle by spring CC. This holds the tab clutch engaged until the carriage arrives at the selected stop position. Prior to the selected stop position, long projection V in lane 3 releases latch CD permitting the selected stop to disengage the tab clutch as the stop moves over the stop bumper, thus causing the carriage to stop.

Should a No. 7 control pin (DS) be active in lane 15 when motor bar No. 1 is depressed and a short projection is active in lane 3, the carriage returns one stop position without using a lane of control. The return control slide is lowered into the path of the kicker arm by depression of motor bar No. 1 causing the return clutch to be engaged during the machine cycle. Also,

depression of motor bar No. 1 indexes or opens lanes 1, 2 and part of 3 and blocks lanes 4 and 5. The short projection in lane 3 completes the indexing of lane 3 and blocks lanes 1 and 2.

Therefore, since lane 3, which is a tab lane of control and the only lane of control that is open, cannot latch the return paddle as it is raised during the engaging of the return clutch, the carriage returns until the next stop to the left disengages the return clutch and causes the carriage to stop. When motor bar No. 1 is depressed with a short projection active in lane 3 and no control in lane 15 the carriage returns one stop position and spacing takes place.

Lane 1 - Selective Tabulation - Indexed by Motor Bar No. 4

Selective tabulation, using lane 1 control, is indexed as a basic function of motor bar No. 4. The basic functions of motor bar No. 4 should be considered to fully understand selective carriage movement. Anytime motor bar No. 4 is depressed, the following functions should be provided: index or open lane 1; index tabulation; block lanes 3, 4 and 5; prevent return, spacing and car-

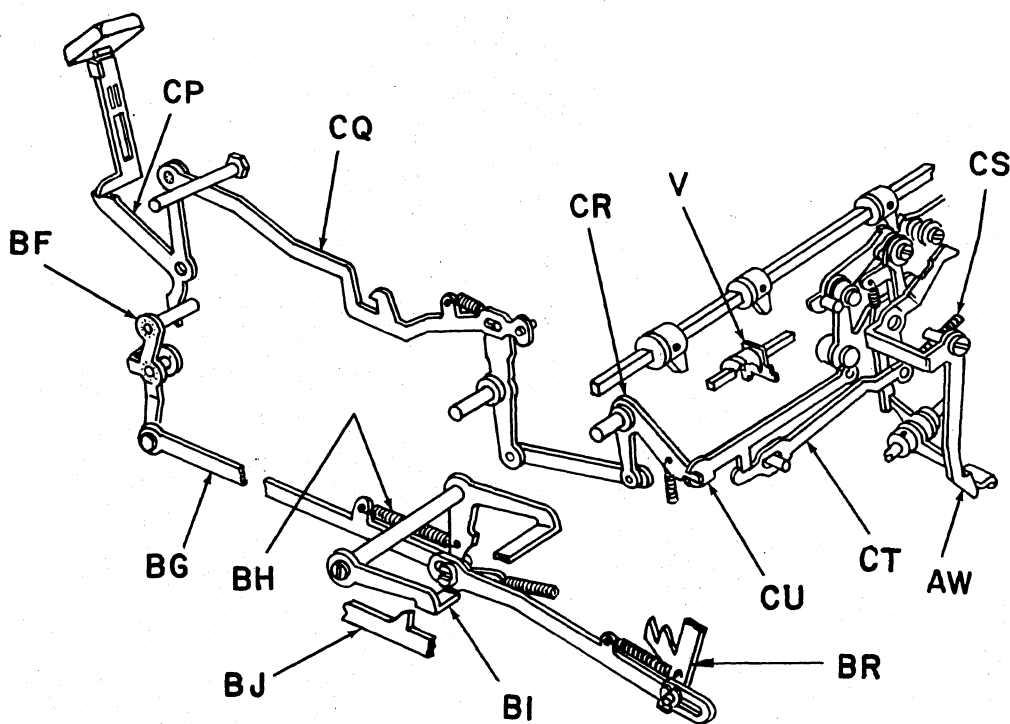


Fig. VI-86

riage opening; prevent repeat machine operation or repeat keyboard and machine operation (lane 21); moves slide for lane 15; and index the drive.

Depression of motor bar No. 4 moves linkage CQ forward to rock bellcrank CR and raise lever CU above lane 1 latch link CT. Since the tabulation control slide is normally in the path of the kicker arm when the carriage controls are active, the tab clutch is engaged near the middle of the machine cycle. As the tab paddle is raised, the step of lane 1 latch AW is moved under the paddle by spring CS to retain the tab clutch engaged until the carriage arrives at the selected stop position. Long projection V in lane 1 releases the lane 1 latch prior to the selected stop position so that the selected stop can disengage the tab clutch and cause the carriage to stop.

Lane 21 is blocked when linkage CQ is pulled forward during the depression of motor bar No. 4. Rocking lever CP lowers bail BI behind the projection of lane 21 link BJ, through lever BF, link BG and spring BH, to prevent a control pin in lane 21 from indexing repeat of machine operation or repeat of keyboard and machine operation.

Depression of motor bar No. 4 also permits lane 15 to be active should there be a control pin in lane 15.

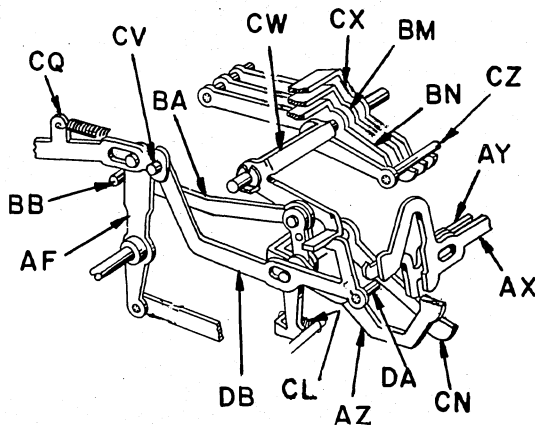


Fig. VI-87

Lanes 4 and 5 are blocked when lever AF is rocked during depression of motor bar No. 4. Lever AF contacts stud BB to move link BA forward and rock the arm of bail AZ up into the path of lanes 4 and 5 latching links AY and AX.

A short projection in lane 3 is prevented from blocking lane 1 when motor bar No. 4 is depressed. As link CQ moves forward during the depression of motor bar No. 4, stud CV moves slide DB forward to position stud DA over the rear arm of bail CN. Then, when a short projection in lane 3 attempts to rock bail CN, the bail is blocked and spring CL yields. Thus, lane 1 is permitted to be active.

Slide DB also prevents indexing of return, spacing and carriage opening. As the slide moves forward, the hook of slide DB is positioned over the formed ear of bail CW. This prevents bail CW from rocking and causes stud CZ to block bails BN, BM and CX; thus, preventing the return, spacing and carriage opening control slides from being lowered into the path of the kicker arms.

Carriage Movement Disabled by Motor Bar No. 3.

Carriage movement is prevented when motor bar No. 3 is depressed and through the basic functions of the motor bar, other controls are indexed or disabled. The basic functions of motor bar No. 3 are: disable carriage tabulation; prevent carriage return; index spacing; disable repeat machine operation or repeat keyboard and machine operation (lane 21); index the drive trip.

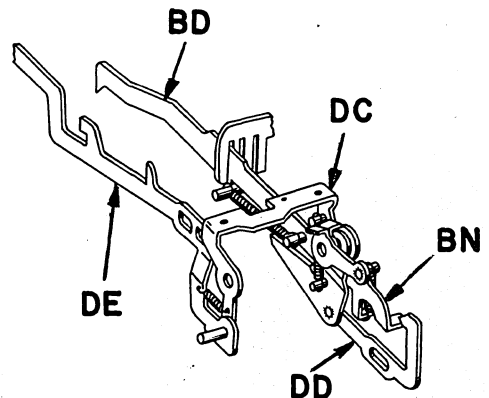


Fig. VI-88

As motor bar No. 3 is depressed, link DE is moved forward, rocking bail DC, causing the forward projection of bail DC to raise tabulation control slide BD out of the path of the kicker arm;

thereby disabling carriage tabulation. Rocking bail DC positions the hook of link DD over the formed ear of bail assembly BN to prevent the bail assembly from lowering the return control slide into the path of the kicker arm; thereby preventing carriage return from being indexed.

The drive is tripped and lane 21 disabled through depression of motor bar No. 3 in a manner similar to motor bars No. 1 and No. 4. When motor bar No. 3 is depressed, spacing is provided as previously described under the spacing subject.

Tests and Adjustments

NOTE: When a lane of control is fully indexed, its bellcrank should have at least .005" latching lead behind the latch plate.

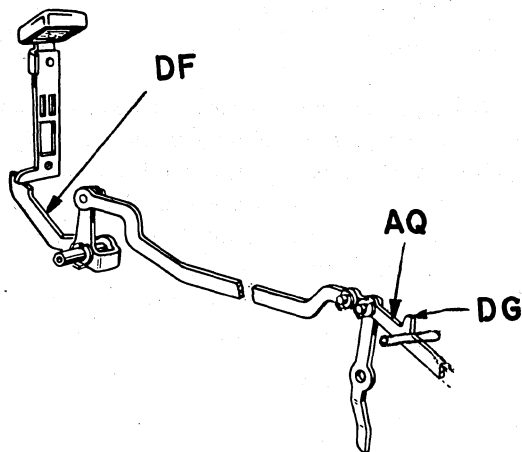


Fig. VI-89

C19-1 With the machine normal, the motor bar No. 1 keystem should contact the arm of bail DF.

TO ADJUST, weave bail DF as required.

NOTE: After weaving bail DF check to see that ear DG of link AQ is limiting on the post in the right sideframe of the machine.

REASON: To ensure immediate pickup of the component linkages.

C19-3 With motor bar No. 1 depressed and the drive tripped, cycle the machine until the latch plates lower. Lane 2 bellcrank should have no less than .005" latching lead behind the latch plate.

TO ADJUST, recheck test C19-1.

REASON: To ensure indexing and retaining of the carriage return mechanisms in lane 2.

C19-4 With motor bar No. 1 depressed, the return slide should be lowered to its active position and the tabulation slide should be raised to

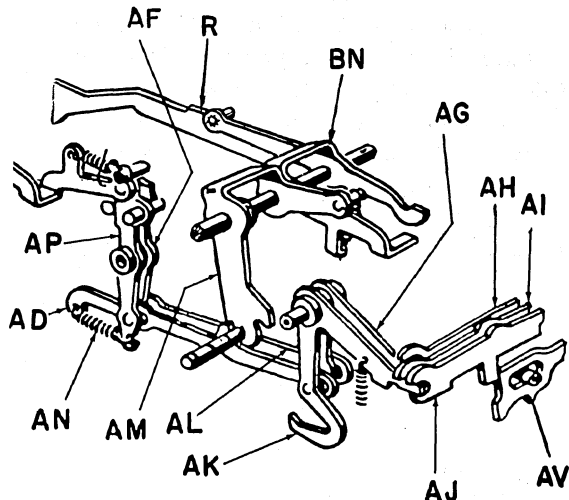


Fig. VI-90

the top of the slot of the guide comb without binding.

TO ADJUST, weave bail BN.

REASON: To ensure indexing and retaining of carriage return mechanisms and the raising of the tab slide to an inactive position to prevent simultaneous indexing of the tab and return slides.

C19-5 With motor bar No. 1 depressed, the space slide must be lowered into active position.

TO ADJUST, recheck test C19-1.

REASON: To ensure indexing and retaining the spacing mechanisms from motor bar No. 1.

C19-6 With motor bar No. 1 depressed, bellcrank AG should raise lever AH, bellcrank AK should raise lever AI and AJ to clear link AV in

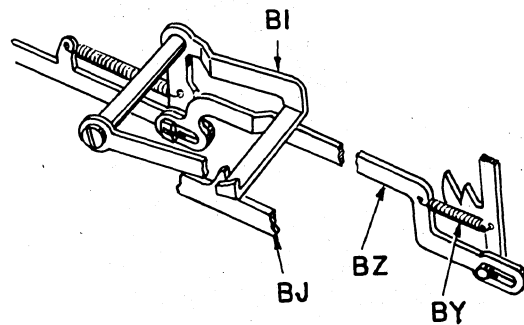


Fig. VI-91

their respective lanes by at least .005".

TO ADJUST, recheck test C19-1.

REASON: To ensure a carriage return in lane 2 by blocking lanes 4 and 5.

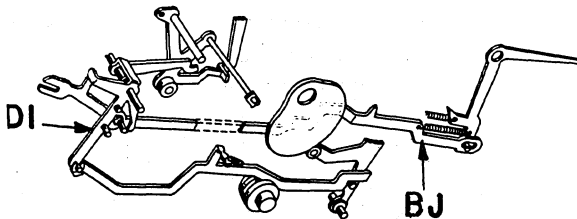


Fig. VI-92

C19-8 NOTE: With motor bar No. 1 depressed, bail BI should be lowered to block slide BJ with clearance between bail BI and the projection on BJ. Raise repeat bellcrank and cycle machine

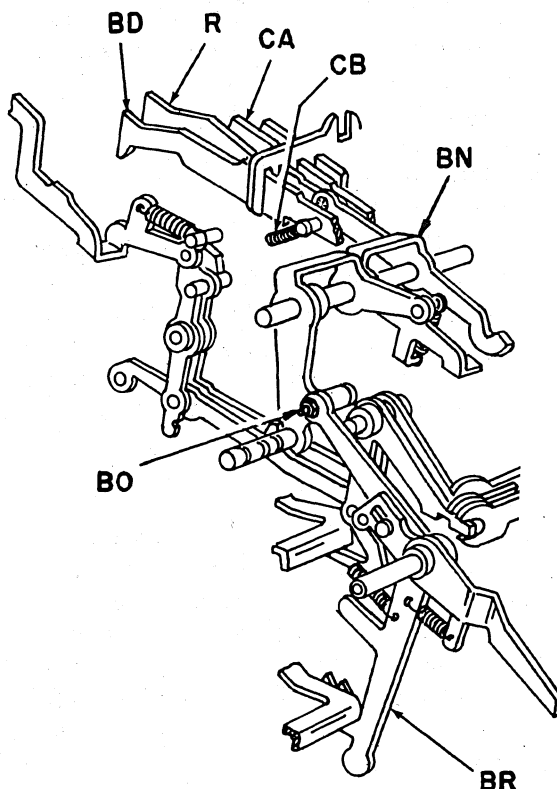


Fig. VI-93

until the bellcrank is latched by the latch plate. Ear on DI should have at least 1/2 hold on the front projection of slide BJ.

REASON: To ensure disabling repeat mechanism when indexed by lane 21 with lane 15 inactive.

C19-9 With motor bar No. 1 depressed and lane 15 activated by a No. 7 control pin, bellcrank BR should latch on its rear step and space slide CA should be normalized by the camming action of eccentric BO on bail BM.

NOTE: The blocking bail BI should be raised to clear the projection on the repeat slide BJ by at least .003".

TO ADJUST, turn eccentric BO to raise space slide CA to the top of its guide comb.

REASON: To enable repeat of machine operation and the disabling of spacing when so indexed by control pins in lanes 15 and 21.

NOTE: With a No. 7 control pin in lane 15 and an index in lane 3, the carriage will return one stop without using any lane of control when motor bar No. 1 is depressed.

C19-10 With motor bar No. 1 depressed and lane 15 activated by a No. 5 control pin, bellcrank BR should be latched on its front step and space slide CA and return slide R should be raised to their inactive positions and the tab slide lowered to its active position.

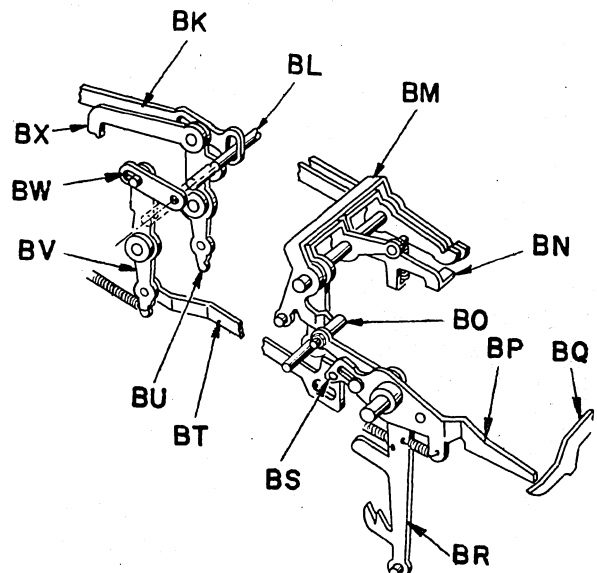


Fig. VI-94

NOTE: Blocking bail BI should be raised to clear the projection on repeat slide BJ by at least .005".

TO ADJUST, starting with the high side up, turn eccentric BO as required.

NOTE: Recheck test C19-9.

REASON: To enable repeat of machine operation, permit carriage tabulation in lane 1, and disable spacing and carriage return from control pins in lanes 15 and 21.

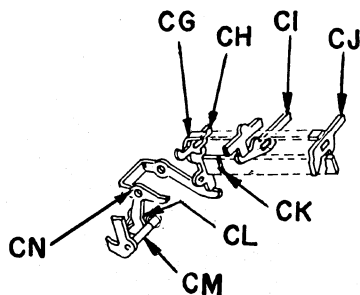


Fig. VI-95

C19-11 With motor bar No. 1 depressed, a No. 5 pin in lane 15 and a short projection on the skip and return disc in lane 3, bail CN should raise slide CG to release lane 3 slide CI and block lanes 1 and 2 with its lower projection, with the lower projection of slide CG.

TO ADJUST, turn eccentric I as required.

NOTE: This adjustment affects lanes 3, 4 and 5.

REASON: To ensure carriage travel in lane 3 by completely indexing the lane 3 mechanisms and to prevent carriage travel in lanes 1 and 2.

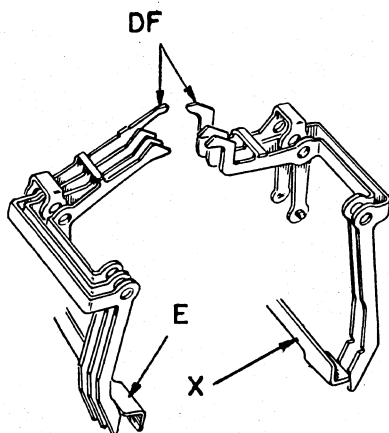


Fig. VI-96

C6-1-10 The normalizing bails DF for skip and return latches in lanes 1 through 5 should not limit the upward movement of the latches and should have no more than .010" overlift above the latches.

TO ADJUST, bend the lips of the normalizing bails DF.

REASON: To permit correct indexing and normalizing of the skip and return latches.

C6-1-12 With a carriage return indexed and the main camshaft manually cycled to approximately 205° for maximum lift of the return paddle X, there should be .015" to .030" clearance between the underside of the ear on return paddle X and return latches in lanes 2 or 5.

TO ADJUST, weave the paddle arm up or down to position the formed ear properly.

REASON: To ensure safe latching lead for the return paddle.

C6-1-13 With a carriage tabulation indexed and the main camshaft manually cycled to approximately 205° for maximum lift of tab paddle E, there should be .015" to .030" clearance between the underside of the ear on tab paddle E and tab latches in lanes 1, 3 or 4.

TO ADJUST, weave the paddle to position the formed ears.

REASON: To ensure safe latching lead for the tabulation paddle.

C6-1-14 With the center pad of Kit 430 resting on top of the tappets and the other pads resting on the height blocks and tab and return latches limiting on paddles E and X, there should be at least .003" but no more than .010" clearance of the apex of tab and return latches under Kit 430.

TO ADJUST, bend paddles E and X to left or right.

REASON: To ensure that the long projections of disc will release tab and return latches and that short projections will not release latches.

C6-1-15 NOTE: With tab and return latches in lanes 1 through 5 limiting against paddles E and X, tappet actuating levers for lanes 1 through 5 must be free to drop and not bind on retaining links 1 through 5.

REASON: To permit retaining links to hold skip and return latches inactive until indexed.

C6-1-6 Facing the rear of the machine, rotate

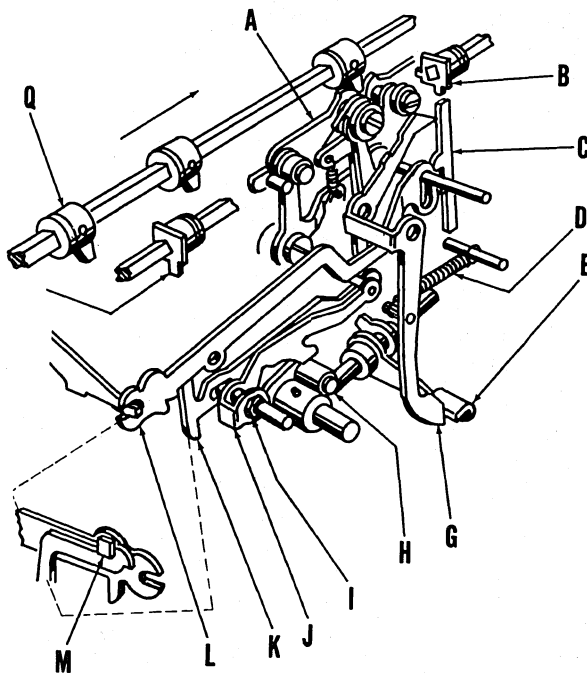


Fig. VI-97

the camshaft counter-clockwise to raise the tapets in lanes 3, 4 and 5 to their extreme upper position. The stud on arm J should raise the left end of the sensing lever in lane 5 clear of, but not more than .015" above the pad on the sensing lever guide comb.

TO ADJUST, starting with the high side of eccentric I toward the guide comb, turn the eccentric as required.

NOTE: This adjustment is to be checked visually.

REASON: To provide sufficient movement for indexing and retention of carriage travel mechanisms in lanes 3, 4 and 5.

C6-1-16 With lanes 4 and 5 selected by a short projection on disc, and the machine manually cycled to 205° , the square stud in the lanes 4 and 5 sensing levers should clear the upper projection of retaining links in lanes 4 and 5 by at least .005" and the bellcranks should have at least .005" latching lead behind the latch plate. TO ADJUST, starting with the high side of eccentric I toward the guide comb, turn the eccentric.

REASON: To ensure indexing and retaining mechanisms for carriage travel in lanes 4 and 5.

C6-1-17 With lane 5 carriage return indexed and the bellcrank latched behind the latch plate by at least .005", the carriage return slide should be lowered into active position in front of the kicker arm, and the tabulation slide raised to the top of the slot in its guide comb.

NOTE: The tabulation slide is to be free and not bind in the top of its guide comb.

TO ADJUST, weave bellcrank BN.

REASON: To ensure indexing and retaining the carriage return mechanism and prevent simultaneous indexing of the tabulation and return control slides.

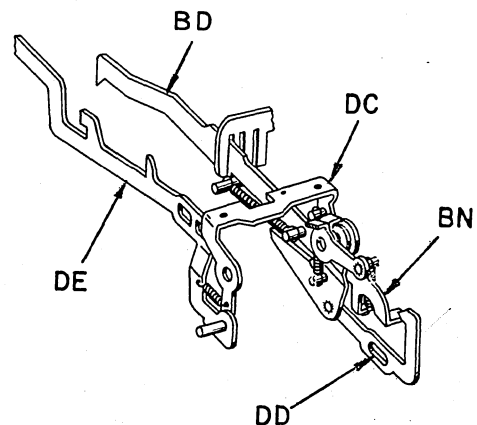


Fig. VI-98

C24-2 With normalizing lever in the forward position and Motor Bar No. 3 depressed, tabulation control slide BD should be raised to top of slot in guide comb and should be free and not bind.

TO ADJUST, weave left arm only of bail DC as required.

REASON: To ensure disabling carriage tabulation.

C24-3 With Motor Bar No. 3 depressed, blocking lever DD should position its hook over lip bail BN with no more than .005" clearance.

TO ADJUST, bend lip of bail BN as required.

REASON: To prevent carriage return.

C24-4 NOTE: With Motor Bar No. 3 depressed, the form space slide should be lowered to active position.

C24-5 NOTE: With Motor Bar No. 3 depressed and blocking bail BI lowered behind the projec-

tion on repeat slide BJ, there should be no more than .020" clearance between the blocking bail and the projection on the repeat slide. Cycle the machine until the latch plates lower. Manually raise repeat bellcrank lane 21 to latch behind latch plate. Check the ear of bellcrank DI to have at least a half hold on front projection DH of repeat slide.

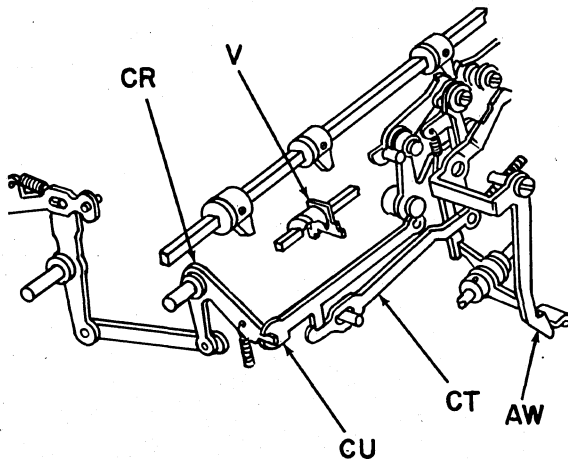


Fig. VI-99

C25-2 NOTE: With Motor Bar No. 4 depressed, bellcrank CR should raise the lower projection of latch CU to clear link CT by at least .005" in order to ensure indexing control lane No. 1.

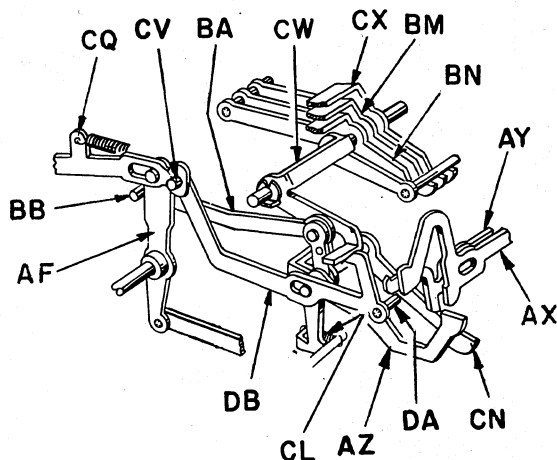


Fig. VI-100

C25-3 NOTE: With Motor Bar No. 4 depressed, arm CN should be raised to block links AY and AX in order to ensure blocking lanes 4 and 5.

C25-4 With the normalizing lever in the forward position and motor bar 4 depressed, the hook of DB should have .003" to .005" clearance over the lip of CW.

NOTE: Stud DA should be positioned over CN with not more than .003" clearance.

TO ADJUST, bend lip of CW as required. After adjusting check hook of DB to pass under the lip of CW when the normalizing lever is in the rearward position and motor bar 4 depressed.

REASON: To ensure carriage tabulation in lane 1 by blocking lane 3 mechanism and prevent carriage return, spacing and carriage opening operations.

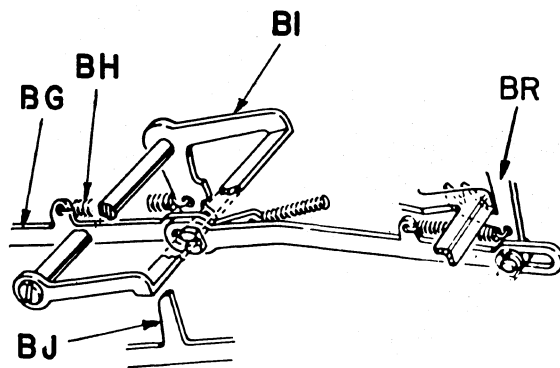


Fig. VI-101

C25-5 NOTE: With Motor Bar No. 4 depressed and blocking bail BI lowered behind the projection on repeat slide BJ, there should be no more than .020" clearance between the blocking bail and the projection on the repeat slide. Cycle the machine until the latch plate lowers. Manually raise repeat bellcrank, lane 21, to latch behind latch plate. Check the ear of bellcrank DI to have at least a half hold on front projection DH of repeat slide.

C25-6 NOTE: With Motor Bar No. 4 depressed and lane 15 (DS) activated by a No. 7 control pin, bellcrank BR should latch on its first step and bail BI should be raised to clear the projection on repeat slide by at least .003" in order to enable repeat of machine operation when indexed by control pins in lanes 15 and 21.

C25-7 NOTE: With Motor Bar No. 4 depressed and lane 15 (DSR) activated by a No. 5 control pin, bellcrank BR should latch on its second step and bail BI should be raised to clear the projec-

tion on repeat slide by at least .005" in order to enable a repeat of machine operation when indexed by control pins in lanes 15 and 21.

C18-1 With Motor Bar No. 3 depressed, carriage opening slide CA should be fully indexed but should not bind on spring anchor stud in right side frame of carriage drive unit.

TO ADJUST, weave bail CX as required.

REASON: To ensure indexing of carriage opening from depression of Motor Bar No. 3.

Burroughs
SERIES F25 - F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F 700 and F 5000)

INSTRUCTION BOOK

Section VII



MECHANISMS AND ADJUSTMENTS
FEATURES

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AUTOMATIC COUNT MECHANISMS

Automatic count mechanisms are used to count and print the number of certain items posted to an account, such as checks, purchases, or payments; to advance and print a check number on payroll applications; to count and accumulate the total number of items posted during a posting run, such as checks, deposits, or balances; etc.

The automatic count mechanisms may be controlled from carriage controls; from carriage controls and selection of proper registers; or from carriage controls, register selection and depression of amount keys.

COUNT CONTROLLED FROM CARRIAGE CONTROLS IN LANE 24

When the automatic count mechanism is controlled from carriage controls in lane 24, the carriage controls must be active with a No. 4 control pin in lane 24 in order to obtain a count.

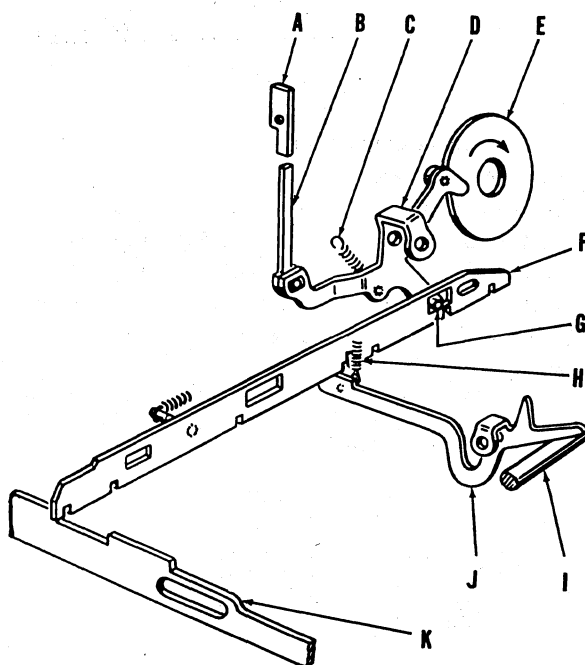


Fig. VII-1

With the machine normal, the cutout in slide F is located to the right of count slide K.

Early in the machine cycle as sensing cam E is rotated, spring C rocks bellcrank D, which, through tappet B, limits on No. 4 control pin A. Rocking of bellcrank D moves slide F to the left, through stud G, to align the cutout in slide F with count slide K, thus permitting count slide K to be moved forward to index a count.

When the machine is operated with the carriage controls active and no pin in lane 24, bellcrank D, through stud G, moves slide F to its leftmost position, blocking count slide K to prevent indexing a count. As actuating shaft I moves forward, spring H swings latch J into a cutout in slide F to prevent restoration of slide F and possible release of count slide K until actuating shaft I has returned to normal.

During a machine operation in which the carriage controls are disabled, slide F is retained in normal position blocking count slide K to prevent indexing a count.

Tests and Adjustments

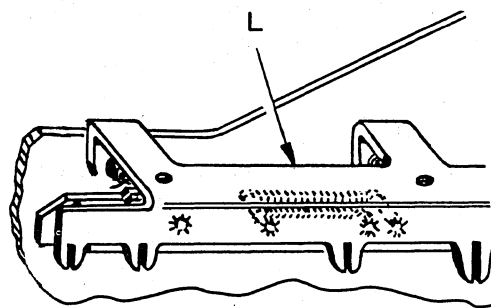


Fig. VII-2

NOTE: Tests for Sensimatic Control Unit, Sensing Camshaft and Sensing Bellcranks must be made prior to the following.

A14-1 With the carriage control lever forward and no pin active in lane 24, cycle the machine to approximately 130°. Count slide(s) K should have a 3/4 hold on cross slide F.

TO ADJUST, bend bracket L up or down.

REASON: To ensure blocking the count slides when the count mechanism is not indexed.

A14-2 With the carriage control lever forward and a No. 4 pin active in lane 24, cycle the

machine to approximately 130° . Cross slides F should be positioned to align their cutouts with count slides K.

TO ADJUST, position bracket L laterally.

REASON: To ensure proper indexing of the cross slides.

A14-3 With the carriage control lever forward and no control pin active in lane 24, cycle the machine to approximately 130° . Cross slides F should be positioned to block the forward movement of count slides K.

TO ADJUST, recheck A14-2.

REASON: To ensure blocking the count slides.

A14-4 With the carriage control lever forward and no control pin active in lane 24, cycle the machine to approximately 130° . With cross slides F indexed, detent J should engage the deep step of the slot in the cross slides.

TO ADJUST, reposition detent J.

REASON: To prevent premature restoration of the cross slides and possible release of the count slides.

A14-5 With the carriage control lever forward and a No. 4 pin active in lane 24, cycle the machine to approximately 130° . Detent J should engage the half step of the slot in cross slide F.

TO ADJUST, recheck adjustment A14-2.

REASON: To prevent premature restoration of the cross slides and possible release of the count slides.

COUNT CONTROLLED FROM AMOUNT KEY DEPRESSION

In addition to being controlled from carriage controls in lane 24, the automatic count mechanism may be controlled to count only when amount keys are depressed.

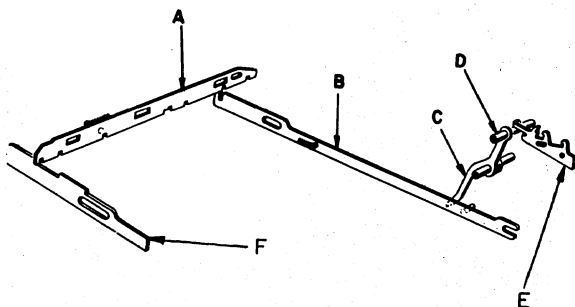


Fig. VII-3

When amount keys are depressed and the drive is tripped, locking strip E limits on the depressed keystem and restricts the movement of shaft D and arm C, thereby allowing the rearward projection of blocking slide B to remain clear of slide A. Slide A may then be moved to the left from carriage controls in lane 24 to align its cutout with count slide F, thus permitting slide F to be moved forward to index a count.

If no amount keys are depressed and the drive is tripped, locking strip E and shaft D allow arm C to move blocking slide B forward to block the movement of slide A, through the rearward projection of slide B, thus blocking count slide F to prevent a count.

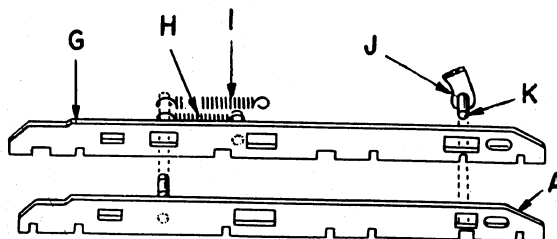


Fig. VII-4

If an additional slide, controlled from the keyboard, is used in conjunction with the carriage controlled slide, keyboard controlled slide G is moved to the left, through spring H, when bell crank J and stud K move carriage controlled slide A to the left through carriage controls in lane 24. Slides A and G are restored to normal through spring I.

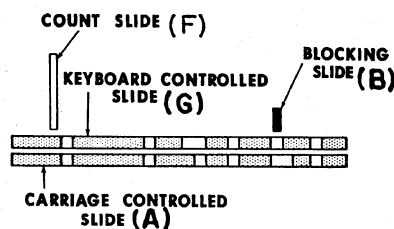


Fig. VII-5

With the machine normal, the cutout in keyboard controlled slide G is located to the right of the projection on the rear of count slide F, thus blocking forward movement of the count slide unless slide G is moved to the left.

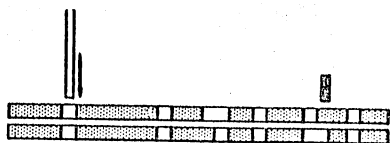


Fig. VII-6

When the machine is operated with amount keys depressed and a No. 4 control pin active in lane 24, slides A and G are moved to the left to align their cutouts with count slide F to permit slide F to move forward to index a count.

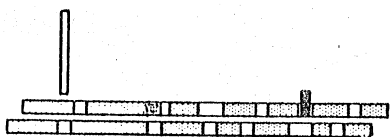


Fig. VII-7

If no amount keys are depressed and the drive is tripped, blocking slide B prevents movement of slide G, thus blocking forward movement of count slide F to prevent indexing a count.

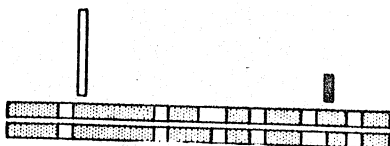


Fig. VII-8

When the machine is operated with amount keys depressed and no control pin in lane 24, slides A and G are moved to their leftmost positions, blocking count slide F to prevent indexing a count.

Tests and Adjustments

- A14-1-1 NOTE:** With amount keys depressed and the drive tripped, there should be no less than .005" clearance between the rear projection on slide B and cross slide A.
- REASON:** To permit indexing of the cross slides.
- A14-1-2** With no amount keys depressed and the drive tripped, the rear projection on slide B should move forward to have a full hold on cross slide A.
- TO ADJUST,** bend arm C on shaft D.
- REASON:** To prevent indexing the cross slide.

COUNT CONTROLLED FROM REGISTER SELECTION

In addition to carriage control and amount key depression control, indexing of the automatic count mechanism may be controlled from selection of registers.

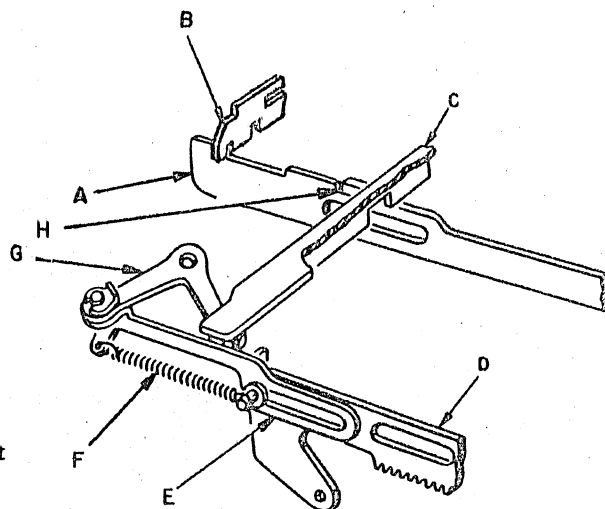


Fig. VII-9

An additional slide C is used to control indexing the count from register selection. With the machine normal, or when register No. 1 is active, stud H blocks forward movement of count slide A to prevent indexing a count. When registers Nos. 2, 3 or 4 are selected, forward movement of register selection rack D moves slide C to the right, through link E, spring F and arm G, to move stud H out of the path of count slide A and align a cutout with slide A, thus permitting count slide A to be moved forward to index a count.

Tests and Adjustments

- A14-2-1** With register selection rack D normal, square stud H should block count slide A and when register selection rack D is indexed to select registers 2, 3, 4 or 5, cutouts in slide C should align with count slide(s) A.
- TO ADJUST,** recheck register selection adjustment code A11-2.
- REASON:** To prevent or ensure indexing count slide(s) A.

A14-2-2 With the machine normal, count slide A should be held .035" to .040" behind the end of square stud H. This should provide .010" clearance between the rear cutout of count slide A and count control slide B.

TO ADJUST, turn eccentric C, Fig. VII-10
REASON: To establish the home position of count slide A and to ensure indexing slides B and C.

A14-2-3 When count slide A is at home position, index arm B should align with and contact the stud in count slide A.

TO ADJUST, position index arm L on shaft K as required.

REASON: To establish the home position of index arm L.

A14-2-4 When the carriage controls are inactive and the machine is manually operated, stud F on index strip E should have .030" to .035" clearance over the step of arm G, but when the count mechanism is indexed and the machine is operated manually to move count slide A forward, stud F in index strip E should have a full hold on the step of arm G.

TO ADJUST, reposition arm G on shaft K when index arm L is contacting the stud on count slide A.

REASON: To prevent or ensure accumulation of the automatic count.

AUTOMATIC COUNT, COLUMN 3 THROUGH 9 CARRIAGE CONTROLLED, LANE 24

This mechanism is used to count items or advance a number when indexed from carriage controls in lane 24. To obtain a count, the car-

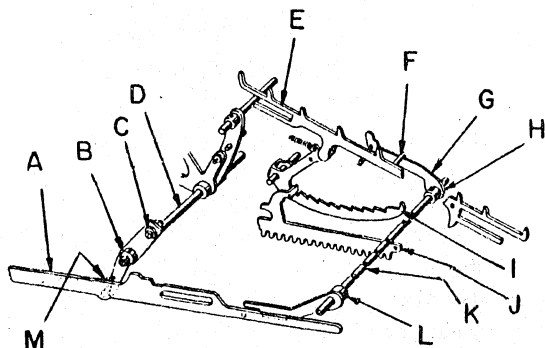


Fig. VII-10

riage controls must be active with a No. 4 control pin in lane 24. The count may be accumulated in any column of columns 3 through 9.

When the machine is operated with the carriage controls active with a No. 4 control pin in lane 24, rocking of shaft assembly D moves arm B away from the stud in count slide A permitting spring M to move count slide A forward camming arm L upward. Upward movement of arm L rocks shaft K and raises arm G into the path of stud F to limit index strip E in No. 1 position.

When index strip E moves rearward, the No. 1 step of index rack I is positioned in the path of the formed ear of adding rack J, thereby indexing "one" to be accumulated in the active accumulator.

During a machine operation when count slide A is blocked from moving forward, stud F clears the step of arm G to index the cipher step of index rack I into the path of the formed ear of adding rack J, thus preventing a count.

Tests and Adjustments

A14-3-1 With the machine normal, there should be .010" to .020" clearance between the rear cutout of count slide A and the cross slide controlled from lane 24.

TO ADJUST, rotate eccentric C on reset shaft D.

REASON: To establish the normal position of count slide A and to permit indexing the cross slide.

A14-3-2 With count slide A normal, index arm L on shaft K should align with and contact the stud in slide A.

TO ADJUST, position arm L on shaft K.

REASON: To establish the normal position of arm L.

A14-3-3 With the carriage control lever rearward, manually operate the machine. Stud F in index strip E should have .030" to .035" clearance over the step of limit arm G.

With the carriage control lever forward and a No. 4 pin active in lane 24, manually operate the machine. Stud F in index strip E should have a full hold on the step of limit arm G.

TO ADJUST, with index arm L contacting the stud in count slide A, position arm G on shaft K.
REASON: To permit or prevent the accumulation of the automatic count.

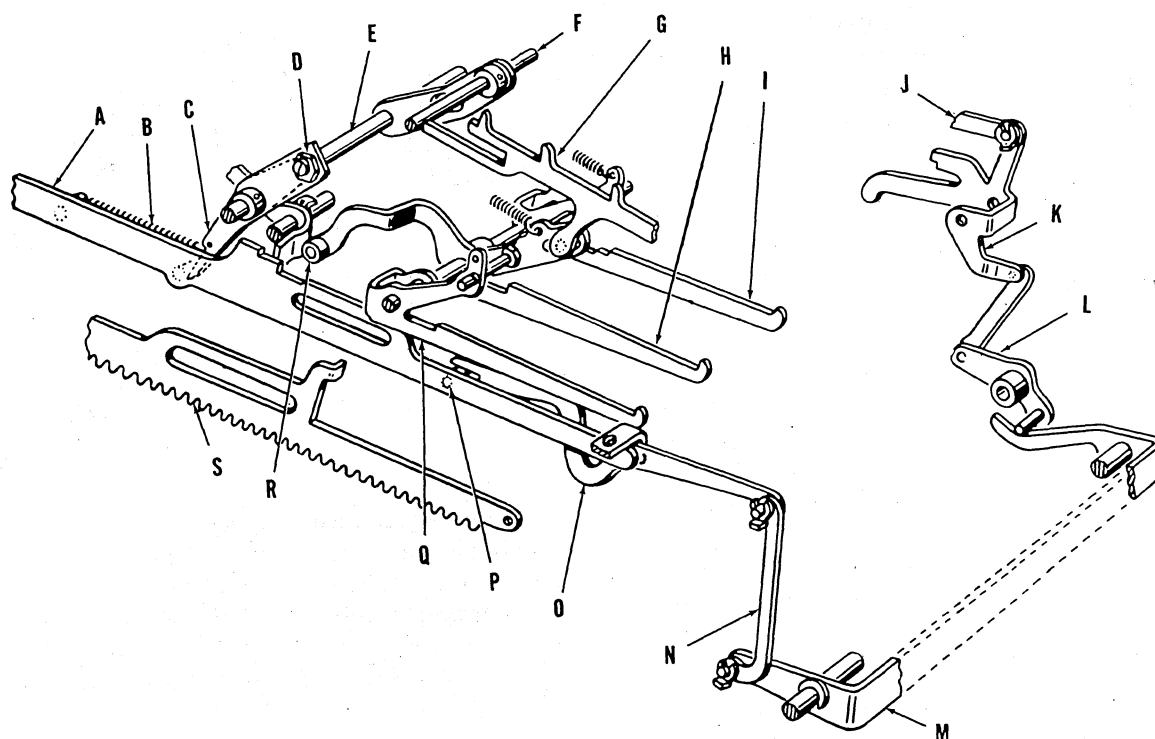


Fig. VII-11

AUTOMATIC COUNT, COLUMNS 10, 11 AND 12 CARRIAGE CONTROLLED, LANE 24

This mechanism is used to count the number of items, such as purchases, payments and returns, that are posted to each account. The Automatic Count is accumulated in crossfooter "A" and printed with the balance of each account.

Crossfooter "A" is permanently split between columns 9 and 10; and columns 10, 11 and 12 are used to accumulate the count. A count of one is accumulated during an automatic count operation regardless of whether the crossfooter is adding or subtracting. During a crossfooter "A" add operation, an automatic count of one is accumulated in the usual manner. To increase the count by one during a crossfooter "A" subtract operation, three nines are subtracted in the count section. The three nines entering the count section during a crossfooter "A" subtract operation will give the same result (due to the lack of a fugitive one in the count section) as adding one during an add operation.

Example:
$$\begin{array}{r} 7 \quad (\text{count total}) \\ 999 - \\ \hline 8 \quad (\text{new count total after subtracting 999}) \end{array}$$

The accumulator pinions in columns 10, 11 and 12 of registers "B" and "C" have ten long carry teeth and will prevent any amounts from coming out when the registers are totaled.

To obtain an automatic count, the carriage controls must be active with a No. 4 control pin in lane 24, amount keys must be depressed and registers 2, 3 or 4 must be active.

When the machine is operated with the carriage controls active with a No. 4 control pin in lane 24, amount keys depressed and register 2, 3 or 4 active, rocking of shaft assembly E moves arm C away from the stud in count slide A permitting spring B to move count slide A forward to position one of its steps under roll R which is on the rear arm of index rack H.

If count slide A is blocked from moving forward, the low step is positioned under roll R. When count slide A moves forward during a cross-

footer "A" add operation, stud P limits on the step of arm O to position the second step under roll R. When a crossfooter "A" subtract operation is indexed, the step of arm O is raised out of the path of stud P, through subtract link J, bail K, arm L, bail M and link N, to allow count slide A to move farther forward and position the high step under roll R.

When index strip restoring shaft F moves rearward, index racks H, I and Q are rocked and limit, through roll R, on the indexed step of count slide A.

When roll R limits on the low step of count slide A, the cipher steps of index racks H, I and Q are located in the path of the formed ears of adding racks S in columns 10, 11 and 12 thus preventing a count.

During a crossfooter "A" add operation when roll R limits on the second step of count slide A, the number one step of index rack I is located in the path of adding rack S in column 10 and the cipher steps of index racks H and Q are located in the path of adding racks S in columns 11 and 12, thus indexing a count of one in column 10.

During a crossfooter "A" subtract operation when roll R limits on the high step of count slide A, the number nine steps of index racks H, I and Q are located in the path of the formed ears of adding racks S in columns 10, 11 and 12. The three nines entering the accumulator during a subtract operation increase the count total by one.

Tests and Adjustments

A14-5-1 During a crossfooter "A" add operation, square stud P in count slide A should limit on the step of limit arm O.

During a crossfooter "A" subtract operation, the step of arm O should clear stud P by .025" to .035".

TO ADJUST, weave bail M.

REASON: To ensure proper positioning of slide A during subtract operations.

A14-5-2 With slide A blocked from moving forward during a machine operation, roll R on index rack H should limit on the low step of slide A.

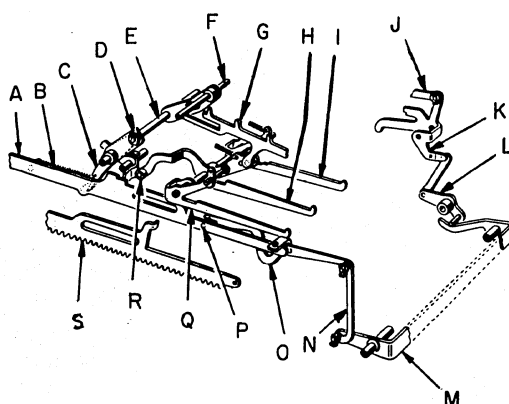


Fig. VII-12

With slide A permitted to move forward during an add automatic count operation, roll R on the middle step; and during a subtract automatic count operation, roll R should limit on the high step of slide A.

TO ADJUST, bend the rear arm of rack H at its offset.

REASON: To ensure indexing the proper steps of the index racks.

A14-5-3 With roll R limiting on the low step of slide A, the formed ears of adding racks C should have no less than .040" hold on the cipher steps of index racks H and Q in columns 11 and 12 and no less than .025" hold on the cipher step of index rack I in column 10.

With roll R limiting on the middle step (add) of slide A, the formed ears of racks S should have no less than .025" hold on the cipher steps of racks H and Q in columns 11 and 12, and no less than .005" clearance over the cipher step of rack I in column 10.

TO ADJUST, bend rack H between its offset and roll R.

REASON: To ensure proper hold of the formed ears of racks S on the proper step of racks H, I and Q.

A14-5-4 With roll R limiting on the high step (subtract) of slide A, the formed ears of racks S in columns 10, 11 and 12 should have no less than .005" clearance over the rear steps of racks I, H and Q.

TO ADJUST, recheck A14-5-3.

REASON: Same as No. 3.

COUNT, SOLENOID CONTROLLED

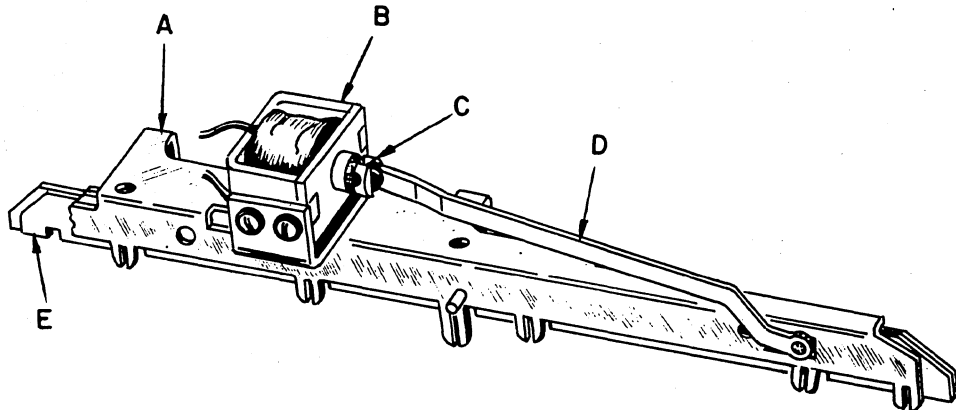


Fig. VII-13

Solenoid control of count mechanism is used in place of lane 24 control on machines that use lane 24 to control the "C" accumulator section. Solenoid control of count is used for dial count or accumulator count except when keyboard control, register control or lane 17 control is required.

The solenoid control of count feature consists of a solenoid actuated control slide, a full wave rectifier power pack and three control switches.

Solenoid B is located on top of count control slide bracket A. When the solenoid is de-energized, a spring holds control slide E to the right to prevent the count slide(s) from moving forward during the machine cycle. When solenoid B is energized, plunger C pulls slide E to the left through link D. This aligns the cutout(s) of control slide E with the count slide(s) so that during the machine cycle the count slides can move forward to advance the count.

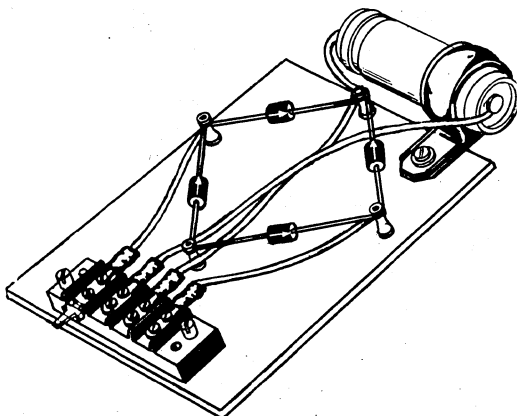


Fig. VII-14

D. C. voltage is required for the correct functioning of the solenoid. A power pack, consisting of four diodes and a capacitor arranged to provide full wave rectification, changes the AC line voltage to DC. The capacitor is connected in the circuit across the output terminals of the rectifier to maintain a more constant and higher DC voltage level.

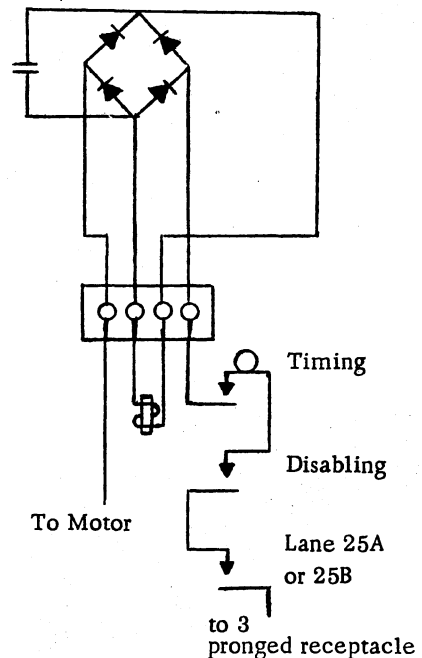


Fig. VII-15

The three control switches are located in the circuit on the AC side of the rectifier.

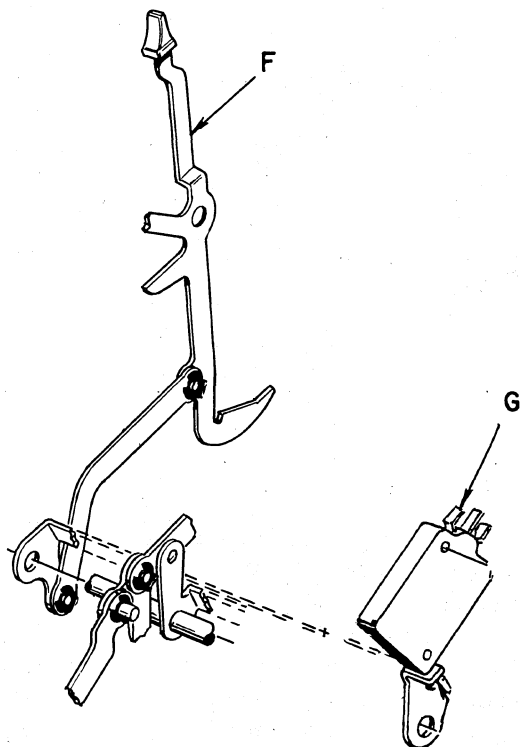


Fig. VII-16

Disabling switch G is actuated by the carriage control disabling lever F to prevent count when the carriage is located in a stop position programmed for count but with the carriage controls disabled. When the carriage control disabling lever is in its rearward position, switch G is open to prevent a complete circuit to the solenoid, but when the lever is moved forward to engage the carriage controls, switch G is transferred to permit completion of a circuit to energize the solenoid.

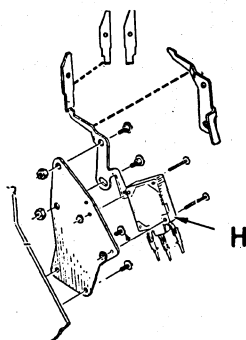


Fig. VII-17

A switch in lane 25A or 25B is actuated by a control pin in a stop position where count is desired. When the carriage is located in a stop position without a control pin in lane 25A or 25B, switch H is open; preventing completion of a circuit to the solenoid. When the carriage is located in a stop position that has a control pin to actuate switch H, the switch is transferred to permit completion of a circuit to energize the solenoid.

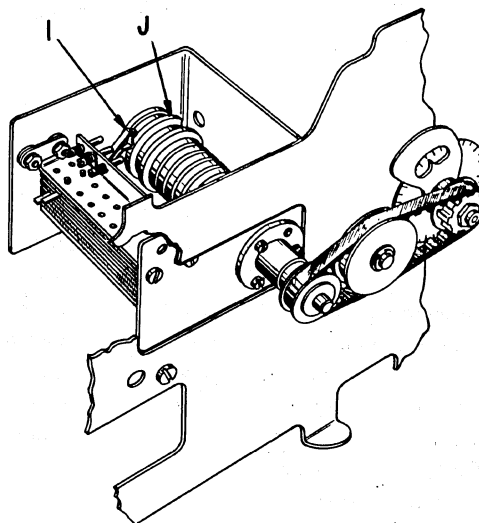


Fig. VII-18

Timing switch I, located on the left auxiliary sideframe, completes a circuit to energize the solenoid during the machine cycle. When the machine is at home position, switch I is open. From approximately 10° to 192° of main camshaft cycle, the high point of cam J transfers the switch to complete a circuit to the solenoid. Since this switch is closed only at a time when the carriage is not moving, the solenoid cannot be energized during carriage movement by a control pin in another stop position.

AUTOMATIC CHECK COUNT MECHANISM, CARRIAGE CONTROLLED, LANE 24

The automatic check count mechanism counts and prints the number of checks posted to individual accounts and also accumulates the net total number of checks posted during a posting run.

Accumulators "A" and "B" are permanently split between columns 10 and 11; and columns 11 through 14 are used to accumulate the check count. The count is accumulated in columns 11 through 14 of accumulator "B" in the normal manner, and in crossfooter "A" as described later under "Crossfooter Count Section Shifting Controls".

To obtain an automatic check count, the carriage controls must be active with a No. 4 control pin in lane 24, amount keys must be depressed in columns 1 through 10 and registers 2, 3 or 4 must be active.

The automatic count is disabled from depression of keys in columns 11 through 14, the non-count key in position 2-B or the character key (SC) position 2-D.

When the machine is operated with the car-

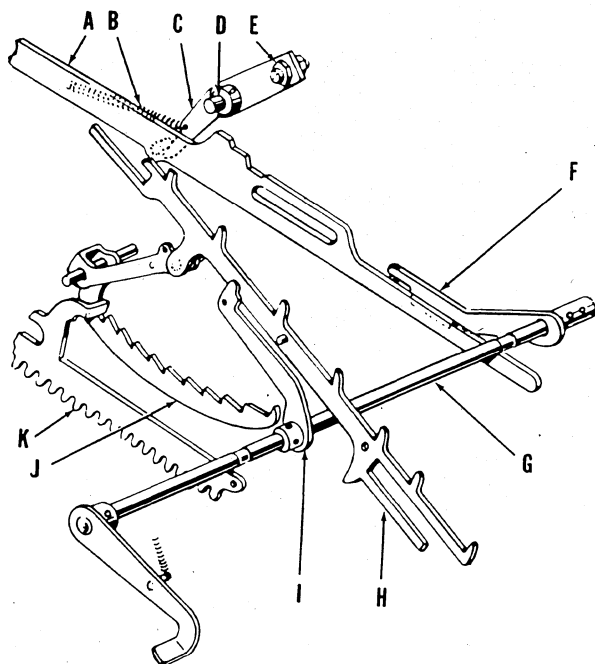


Fig. VII-19

riage controls active with a No. 4 control pin in lane 24, amount keys depressed in columns 1 through 10 and register 2, 3 or 4 active, rocking of shaft assembly D moves arm C away from the stud in count slide A permitting spring B to move count slide A forward camming arm F upward. Upward movement of arm F rocks shaft G and raises arm I into the path of the stud in index strip H to limit index strip H in No. 1 position.

When index strip H moves rearward, the No. 1 step of index rack J is positioned in the path of the formed ear of adding rack K, thereby indexing "one" to be accumulated in column 11 of the crossfooter and active register.

During a machine operation when count slide A is blocked from moving forward, the stud in index strip H clears the step of arm I to index the cipher step of index rack J into the path of the formed ear of adding rack K, thus preventing a count.

Crossfooter Count Section Shifting Controls

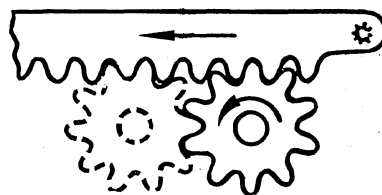


Fig. VII-20

During crossfooter "A" add operations when amounts are indexed in columns 11 through 14, the forward set of pinions is meshed with the adding racks to add the amount in the normal manner.

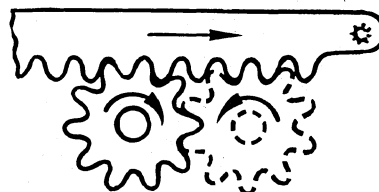


Fig. VII-21

During crossfooter "A" subtract operations when the accumulator is meshed near the beginning of the machine cycle, the rear set of pinions is shifted and meshed with the adding racks to in-

crease the count by one through the rear pinion in column 11 turning the forward pinion in the add direction.

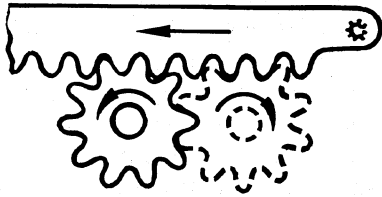


Fig. VII-22

During crossfooter "A" add operations indexed by the Error Correction or Return Check Keys, the rear set of pinions is shifted and meshed with the adding racks to decrease the count by one through the rear pinion in column 11 turning the forward pinion in the subtract direction.

During plus and minus total and subtotal operations, the forward set of pinions is meshed with the adding racks, thus providing a net total of the number of checks posted.

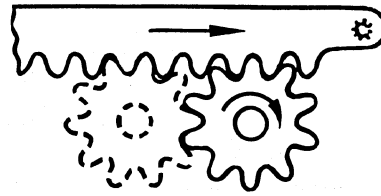


Fig. VII-23

Depression of crossfooter "A" subtract bar M or rearward movement of carriage controlled subtract linkage AK rocks bellcrank L to move link Q rearward and rock shaft assembly R. Rocking of shaft assembly R lowers arm V to allow spring W to lower link AC engaging the vertical slot of link AC with the stud in arm Y.

Rotation of the main camshaft rocks arm AE, through arm AG and roller AF, to move link AC rearward. Rearward movement of link AC rocks arm Y and lever Z to shift the rear set of pinions AA in columns 11 through 14 into active position in line with the adding racks.

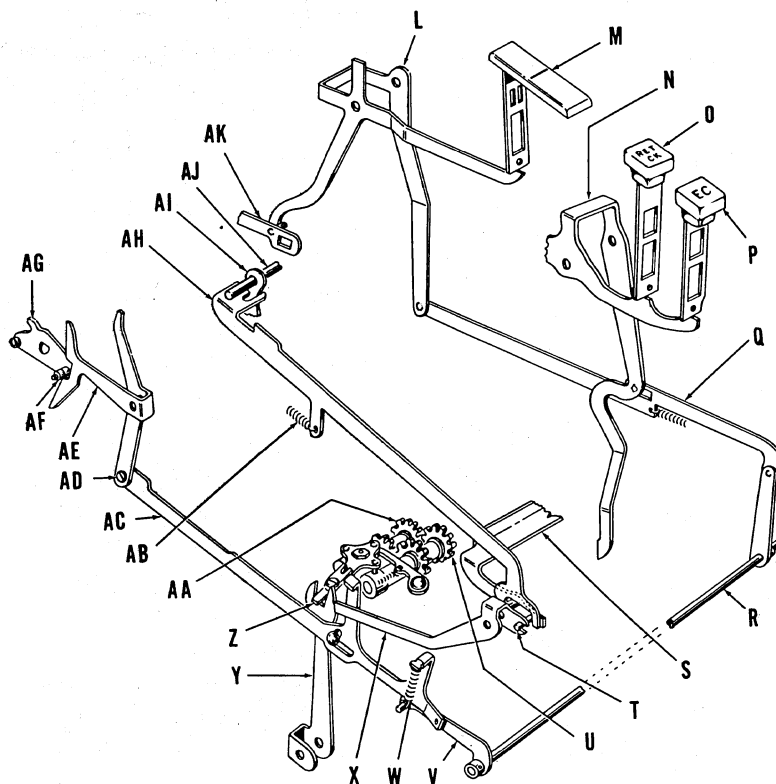


Fig. VII-24

The forward set of pinions U is restored to normal position late in the machine cycle when arm AG and roller AF move link AC forward through arm AE.

Depression of Error Correction key P or Return Check key O rocks lever N to move link Q rearward and rock shaft assembly R. Rocking of shaft assembly R lowers arm V to allow spring W to lower link AC, engaging the vertical slot of link AC with the stud in arm Y, thus indexing the rear set of pinions AA to be shifted into active position when rotation of the main camshaft moves link AC rearward.

During crossfooter "A" total and subtotal operations, rocking of index strip lock bail S rocks arm X, through stud T, positioning the rearward portion of arm X in the path of the formed ear of link AC, thereby permitting the horizontal slot of link AC to idle over the stud in arm Y to prevent shifting of the pinions. This insures taking the totals and subtotals from the forward set of pinions U.

When index strip lock bail S is rocked upward, spring AB moves link AH rearward positioning the forward projection of link AH over stud T to hold index strip lock bail S upward to ensure blocking of the index strips. Link AH is restored to normal position when keyboard locking slide restoring shaft AJ and arm AI are rocked forward.

Tests and Adjustments

A14-6-1 With the crossfooter "A" subtract bar, return check or error correction key depressed, the vertical slot in link AC should freely engage the stud in arm Y.

With the machine normal, or with the machine operated to align the rear set of pinions AA in columns 11 through 14 with the adding racks, there should be no bind between the fork of arm Y and shift arm Z.

TO ADJUST, turn eccentric screw AD.

REASON: To establish the normal position of link AC and to ensure no bind between arm Z and the fork of arm Y.

NOTE: With any of the above keys depressed, the vertical slot in link AC should have a full hold over the stud in arm Y.

A14-6-2 With a crossfooter "A" carriage controlled subtract operation indexed, cycle the machine. The vertical slot of link AC should engage the stud in arm Y prior to rearward movement of link AC.

With a crossfooter "A" carriage controlled non-add operation indexed, cycle the machine. The vertical slot of link AC should not engage the stud in arm Y.

TO ADJUST, weave bail L.

REASON: To permit or to prevent shifting the rear set of pinions AA into alignment with the adding racks during crossfooter "A" carriage controlled operations.

A14-6-3 With lock bail S indexed during a total or subtotal of crossfooter "A", there should be .003" to .005" clearance between arm X and the formed ear on the upper projection of link AC.

TO ADJUST, bend arm X.

REASON: To prevent shifting the rear set of pinions into alignment with the adding racks during a crossfooter "A" total or subtotal operation.

A14-6-4 Manually raise the "A" subtract sensing lever bellcrank (Lane 7), depress the "A" total key and cycle the machine. Check arm X to align the horizontal slot in link AC with the stud in arm Y.

TO ADJUST, recheck A14-6-3.

REASON: To prevent shifting the rear set of pinions into alignment with the adding racks during crossfooter "A" total or subtotal operations in conjunction with a carriage controlled subtract of crossfooter "A".

DISABLING THE AUTOMATIC CHECK COUNT

The Automatic Check Count Mechanism may be disabled from depression of the non-count key in position 2-B, from depression of keys in columns 11 through 14 or character key (SC) in position 2-O.

Depression of non-count key AL rocks arm AP, shaft assembly AQ and bail AS to swing the hooked portion of the arm on bail AS under the formed ear of arm AT, thus preventing shaft as-

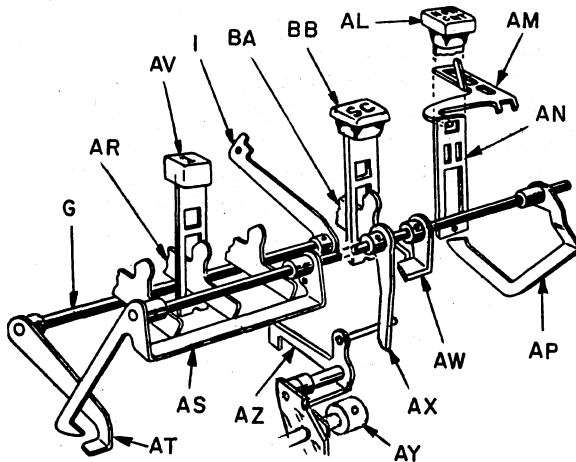


Fig. VII-25

sembly G from rocking arm I into the path of the index strip in column 11. This permits the index rack in column 11 to be positioned in cipher position to block the adding rack in column 11 from moving forward, thereby disabling the automatic check count.

Non-count key AL may be latched in depressed position by moving latch AM forward in a cutout in keystem AN. Latch AM is retained in its forward or rearward position by a flat spring.

Depression of keys in column 11 indexes steps 1 through 9 of the index rack in column 11, thus allowing amounts indexed in column 11 to take precedence over the automatic check count.

Depression of keys AV in columns 12, 13 and 14 cams slides AR forward to rock bail AS and swing the hooked portion of the arm on bail AS under the formed ear of arm AT, thus disabling the automatic check count.

Depression of SC key BB cams slide BA forward rocking bail AW and swinging hook of AS under lip of AT to disable count mechanism. The lower projection of AX contacts stud in AZ causing the rear finger of AZ to be located in the path of stud in the sector disabling count from the carry mechanism in accumulator "B".

Tests and Adjustments

A14-8-1 With keys depressed in columns 11 through 14, the hooked portion of the arm on bail AS should have .005" to .010" clearance under the formed lip of arm AT.

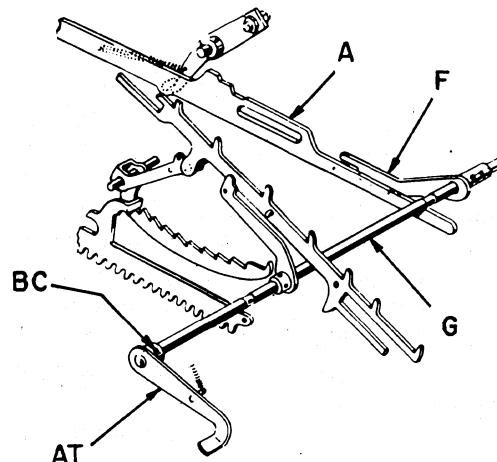


Fig. VII-26

TO ADJUST, loosen set screw BC and, while holding shaft G to limit arm F against the stud in slide A, reposition arm AT.

REASON: To ensure latching the lane 24 count mechanism in an inactive position.

A14-8-2 With keys depressed in columns 11, 12, 13 and 14, the hooked portion of the arm on bail AS should have not less than 1/16" hold on the formed lip of arm AT.

TO ADJUST, weave the hooked arm of bail AS. REASON: To disable the lane 24 carriage controlled count mechanism and enable printing and adding amounts listed on the keyboard.

A14-8-3 With the Non Count key in position B-2 depressed, the hooked portion of the arm on bail AS should have not less than 1/16" hold on the formed lip of arm AT.

TO ADJUST, depress keys in columns 11 through 14, depress the Non-Count key, loosen set screw AO and position arm AP against the Non-Count keystem.

REASON: To disable the lane 24 carriage controlled Automatic Count mechanism.

A14-8-4 With the SC key (position 2 column "0") depressed, the hooked portion of the arm on bail AS should have no less than 1/16" hold on the formed lip of arm AT.

TO ADJUST, depress keys in columns 11 through 14, depress the SC key (position 2 column "0"), loosen the set screw and position arm AW against the keyboard auxiliary slide.

REASON: To disable the lane 24 carriage controlled Count mechanism.

A14-8-5 With keys 1 through 9 depressed succes-

sively in columns 11 through 14, arm AZ should have not less than a full hold on the stud in the count slide, and no bind of the upper fork on shaft AY.

TO ADJUST, with keys depressed in columns 11 through 14, loosen the set screw and reposition arm AX.

REASON: To ensure disabling the lane 17 carriage controlled automatic count.

AUTOMATIC COUNT ADVANCED BY TRIPPING OFF CARRIES IN ACCUMULATOR "B", CARRIAGE CONTROLLED, LANE 17

This mechanism may be used to count certain items, such as deposits, during a posting run or to obtain the total number of accounts posted by counting the number of old balances picked up.

Accumulator "B" is permanently split between columns 10 and 11; and columns 11 through 14 are used to accumulate the count. The count is obtained by tripping off an add or subtract carry in column 11.

Indexing the Count

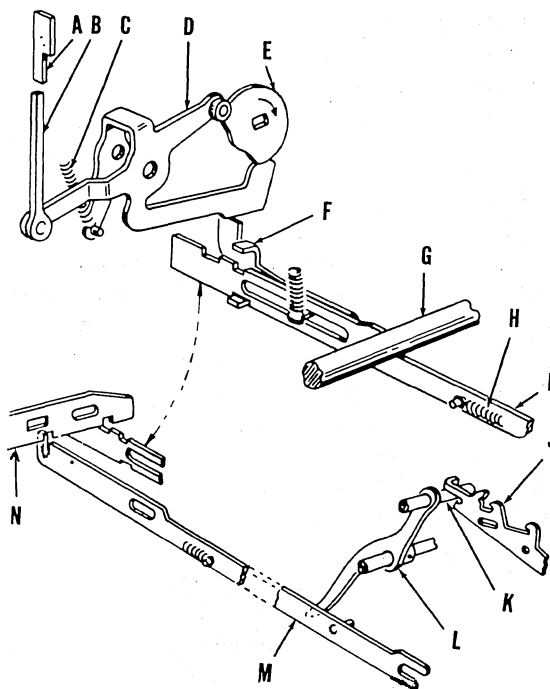


Fig. VII-27

To obtain a count, amount keys must be depressed and the carriage controls must be active with a No. 7 control pin in lane 17.

When amount keys are depressed and the drive is tripped, locking strip J limits on the depressed keystem and restricts the movement of shaft K and arm L, thereby allowing the rearward projection of slide M to remain clear of slide N and permit slide N to be moved to the left, through carriage controls in lane 24, to align a cutout in slide N with count slide I. If no amount keys are depressed and the drive is tripped, locking strip J and shaft K allow arm L to move slide M forward to block the movement of slide N, thus blocking forward movement of count slide I.

Early in the machine cycle as sensing cam E is rotated, spring C rocks lever D, which, through tappet B, limits on No. 7 control pin A. Rocking of lever D moves the lower formed ear of arm F out of the notch of slide I. As the operation continues and adding rack actuating shaft G moves forward, spring H moves count slide I forward to index a count.

When the machine is operated with the carriage controls active and no pin in lane 17, spring C rocks lever D to move the upper formed ear of arm F into the upper notch of count slide I to prevent slide I from moving forward, thus effecting non-counting.

During a machine operation in which the carriage controls are disabled, the lower formed ear of arm F will remain in the lower notch of count slide I to effect non-counting.

Advancing the Count

When the adding rack actuating shaft moves forward, count slide I is moved forward positioning the stud in count slide I in front of pass-by pawl X. When the adding rack actuating shaft moves count slide I rearward, the stud in slide I rocks pass-by pawl X and bail U to lower link V and rock bail W downward. Rocking of bail W lowers slide R to rock shaft assembly Z through studs S or T. Rocking of shaft assembly Z raises or lowers link P, through arm AA, to position bail Q in either add or subtract position and release latch O and carry driver arm AB, thereby tripping off an add or subtract carry.

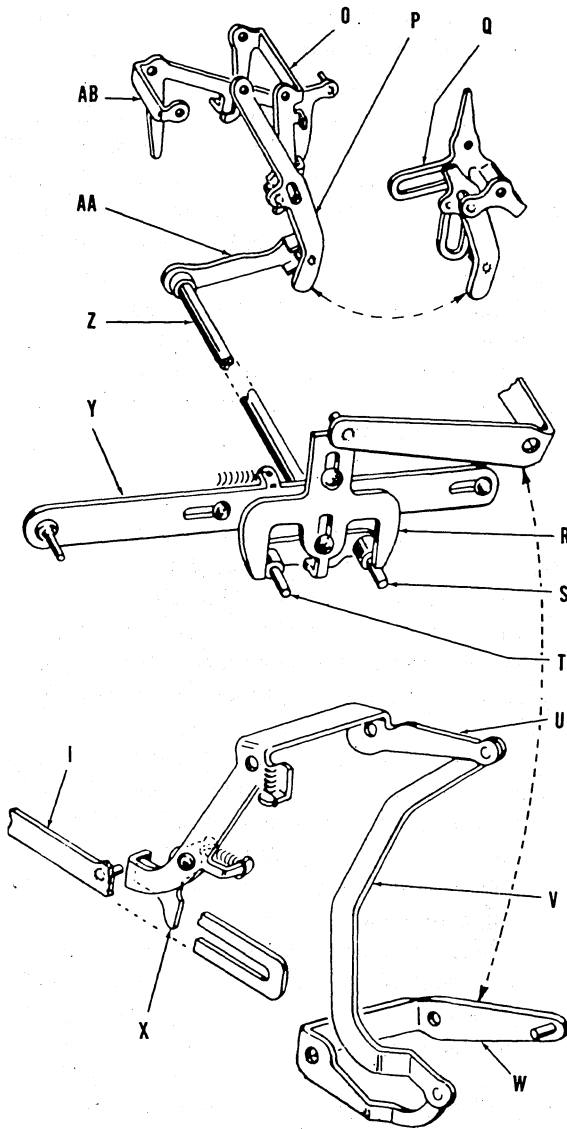


Fig. VII-28

With slide Y in its normal forward position, the rearward projection of slide R is located over stud S. Rocking of bail W lowers slide R and, through stud S and shaft assembly Z, lowers arm AA and link P to trip off an add carry.

When the Error Correction, Return Check or Deposit Correction Key is depressed, slide Y is moved rearward to position the forward projection of slide R over stud T. Rocking of bail W lowers slide R and, through stud T and shaft assembly Z, raises arm AA and link P to trip off a subtract carry.

Tests and Adjustments

A14-4-1 With the machine normal the lower formed ear on detent F should block count slide I.

With no control pin active in lane 17, cycle the machine to approximately 70° . The upper formed ear of detent F should block count slide I.

With a No. 7 pin active in lane 17, cycle the machine to approximately 70° . Detent F should be lowered to its inactive position to permit count slide I to be moved forward.

TO ADJUST, bend the lower arm of lever D.

REASON: To ensure or prevent indexing slide I.

A14-4-2 With studs S and T in a horizontal position, there should be .025" to .035" clearance between studs S and T and the lower projections of slide R.

TO ADJUST, bend supporting bracket for slide Y.

REASON: To permit free movement of slide R.

A14-4-3 With the machine normal there should be no more than .003" clearance between stud in bail W and the upper projection of slide R.

TO ADJUST, weave bail W.

REASON: To permit restoration of slide R and to ensure indexing an add or subtract carry.

AUTOMATIC FEE INDEXING MECHANISM (AIM) CARRIAGE CONTROLLED LANE 20

Automatic Fee Indexing Solenoid Controlled

The automatic fee indexing mechanism, which is indexed from a No. 5 control pin in lane 20, is used for special checking accounts in bank posting applications to automatically index a fee amount to print and accumulate.

Early in the machine cycle, rotation of sensing cam K raises sensing lever B and tappet A to limit on a No. 5 control pin and rock bellcrank J. Rocking of bellcrank J moves slide F rearward, through link E and bail C. The stud on the forward end of slide F rocks index strip lock bail H upward through arm G to hold index strips I at nine position during the machine operation. The normally closed contacts of switch D are held open when the machine is at normal and are transferred when bail C rocks rearward, completing a circuit to the add rack control slide solenoid.

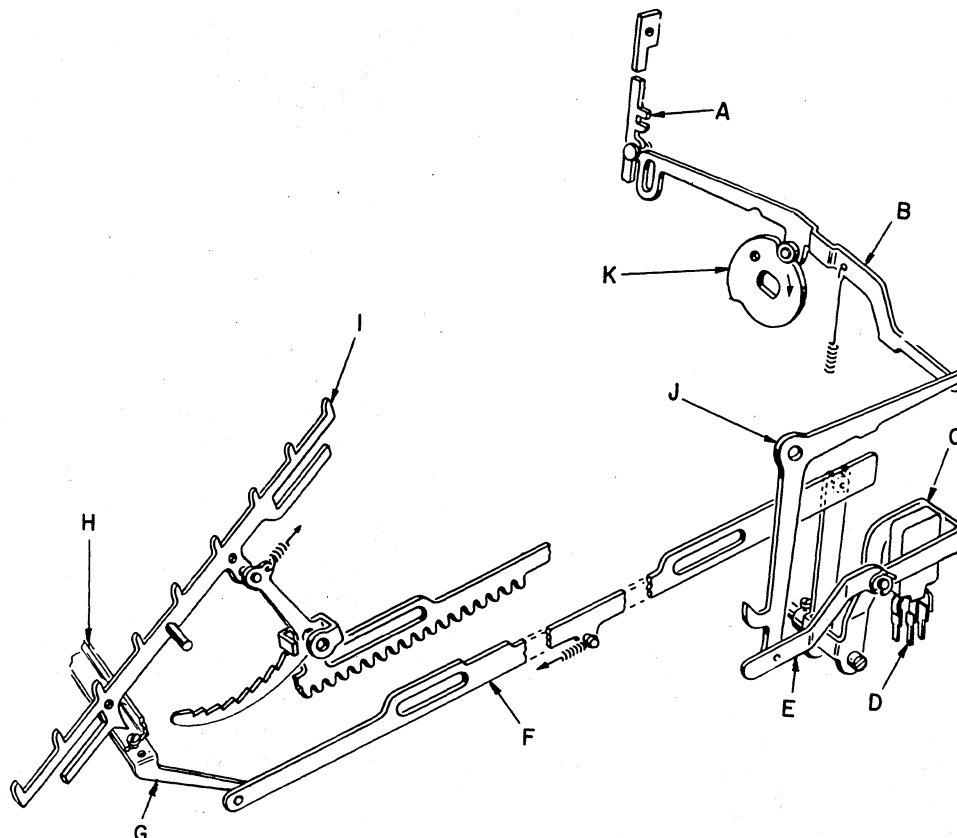


Fig. VII-29

Slide M, attached to the rear guide comb for the add racks, provides a limit for the adding racks when accumulating and printing the amount of the fee.

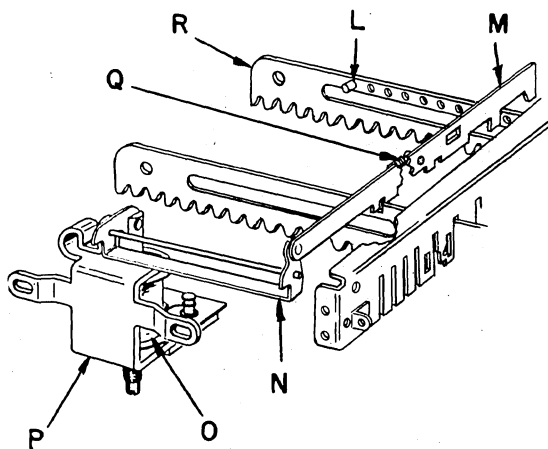


Fig. VII-30

When the machine is operated without a No. 5 control pin in lane 20, slide M remains in its normal position to the left. This permits the add rack in columns 1 and 2 to move forward, through the wide openings in slide M, to any indexed position and the adding racks to the left of column 2 to move forward, through the narrow openings of slide M, to any indexed position.

When the machine is operated with a No. 5 pin in lane 20, switch D completes the circuit to solenoid O causing the plunger of the solenoid to rock bail N. As bail N rocks, slide M is moved to the right, into cutouts in the adding racks to the left of column 2, and the narrow openings of slide M are moved out of alignment with the adding racks. Projections on the bottom of slide M are moved into the path of studs L on the adding racks in columns 1 and 2. Thus the adding racks to the left of column 2 are prevented from moving forward and the adding racks in columns 1 and 2 can only move forward until stud(s) L limit on

slide M. Spring Q restores slide M to the left when solenoid O is de-energized.

Stud L may be installed in one of nine holes in adding rack(s) R to provide indexing of different fee amounts. With stud L in the forward hole of the adding rack, a cipher will be indexed and

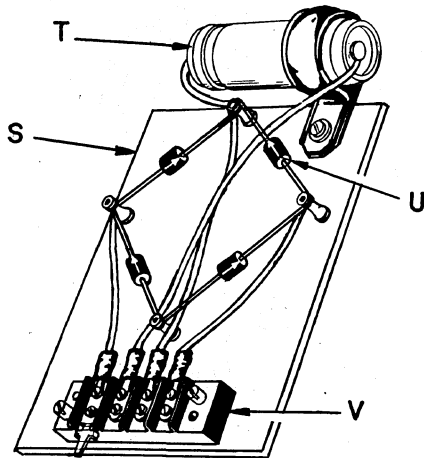


Fig. VII-31

when the stud is in the rearmost hole, an eight will be indexed. No stud in the adding rack permits the adding rack to move forward to limit on the number nine step of the index rack.

D. C. current is required for the adding rack control slide solenoid. A power pack is attached to the back plate of the machine to change the AC line current to DC. Power pack S consists of terminal board V, four diodes U and capacitor T.

The diodes are arranged to provide a full wave rectifier and the capacitor maintains the DC voltage level constant to ensure correct operation of solenoid O. The power pack and solenoid are connected in the circuit parallel to the motor so that the solenoid can be energized only when the motor is running.

Automatic Fee Indexing Mechanical Lane 20 (Early Construction)

Early in the machine cycle, rotation of sensing cam K raises sensing lever B and tappet A to limit on a No. 5 control pin and rock bellcrank J. Rocking of bellcrank J moves slide F rearward, through link E and bail C, to rock arm W and shaft assembly Y through the roll on the forward portion of slide F. Rocking of shaft assembly Y raises arms Z and slides BD to position the projections on slides BD into the path of studs BB. As index strips BC move rearward, studs BB limit on the projections of slides BD to position the proper steps of index racks BE in columns 1 and 2

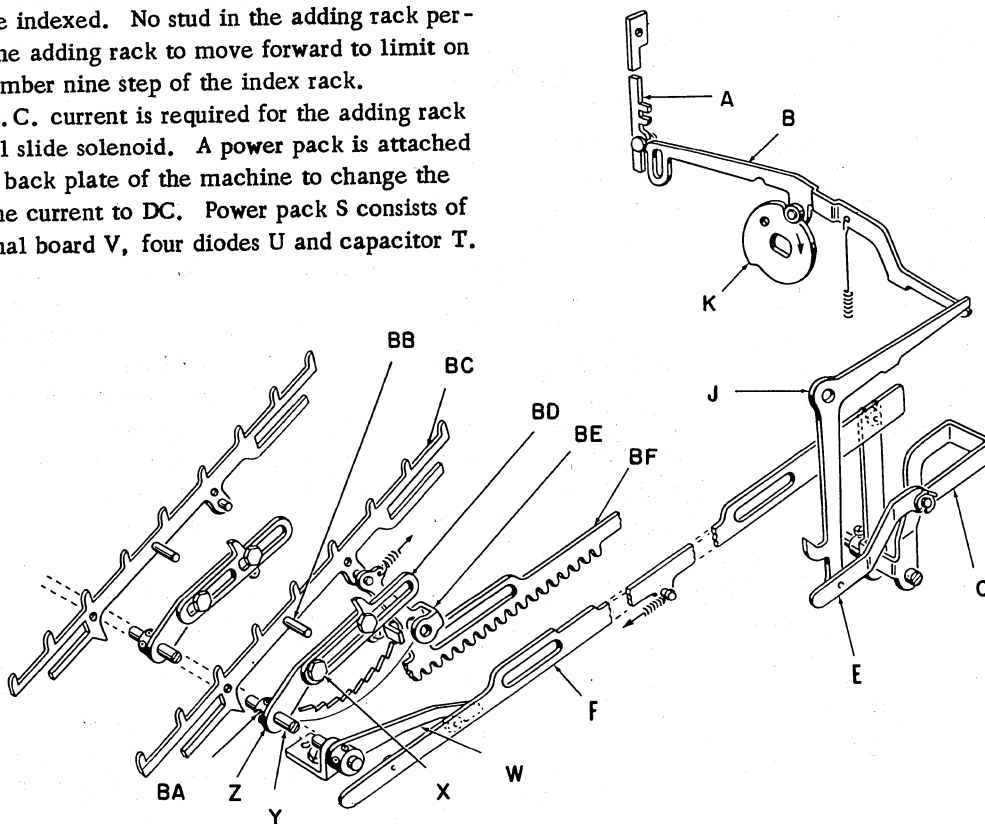


Fig. VII-32

into the path of the formed ears of adding racks BF, thus indexing the fee amount to print and accumulate.

The mechanism may be set to index any one amount from 1 cent to 99 cents by loosening screws X and repositioning slides BD to index different steps of index racks BE in columns 1 and 2.

Tests and Adjustments

NOTE: The Sensing Lever Bellcranks, Sensimatic Control Unit, and Sensing Camshaft should be adjusted before making the following adjustments.

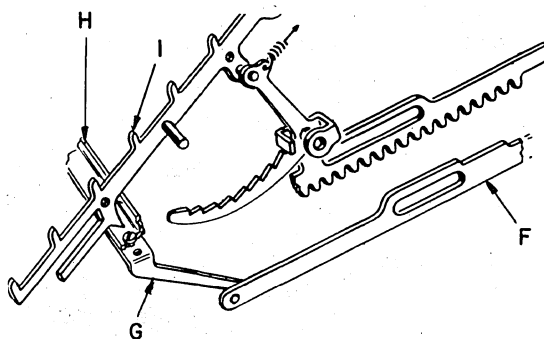


Fig. VII-33

A12-1 When the machine is at home position, the stud in the forward end of rack F should not contact arm G of index strip lock bail H; but when bellcrank J is rocked and held by the latch plate, bail H should be raised to block and hold index strips I.

TO ADJUST, weave the left portion of bail C as required.

REASON: To ensure indexing the fee amount when lane 20 is active.

A12-2 The rear arm of bail N should align centrally in the slot of the solenoid plunger.

TO ADJUST, reposition bracket P on the machine sideframe. If necessary, weave the rear arm of bail N.

REASON: To permit free action of the plunger and bail.

A12-3 When the machine is at home position, slide M should be free to enter the cutouts in the adding rack(s) to the left of column 2.

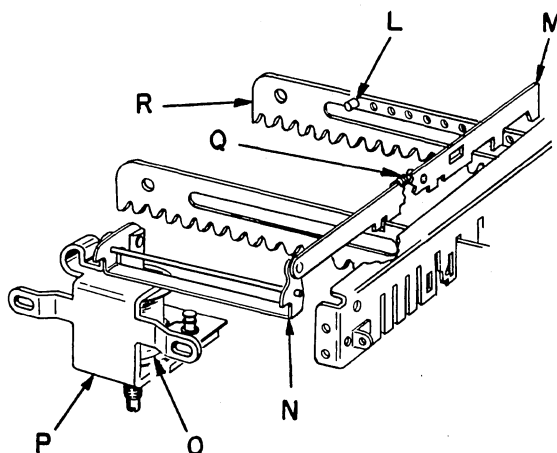


Fig. VII-34

TO ADJUST, recheck adjustments for the normal position of the adding racks and accumulator sections.

REASON: To correctly limit the adding racks during the machine cycle when lane 20 is active.

A12-4 When the machine is manually cycled with a No. 5 pin active in lane 20, bellcrank J should have at least .005" latching lead behind its latch plate.

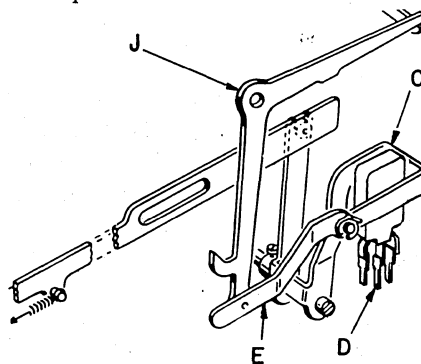


Fig. VII-35

TO ADJUST, bend bellcrank J at its point of contact with sensing lever B.

REASON: To ensure holding the fee mechanism indexed.

A12-5 When the machine is at home position, the contacts of switch D should be held transferred.

TO ADJUST, move the switch mounting bracket.

et rearward until the contacts transfer, then securely tighten the bracket.

REASON: To ensure completing the solenoid circuit when lane 20 is actuated from a No. 5 pin.

A12-6 When the motor switch is closed and bail C is manually rocked to close switch D, solenoid O should be energized to move slide M to the right.

TO ADJUST, check the electrical components.

NOTE: The motor switch must be closed before the solenoid can be energized.

REASON: To ensure limiting the adding racks to accumulate and print the correct fee amount.

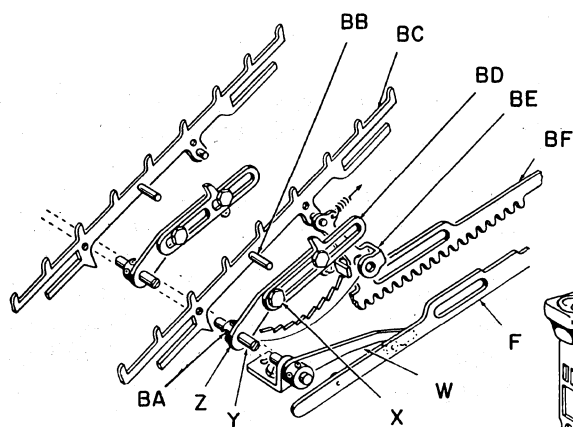


Fig. VII-36

NOTE: In early construction machines A12-4 and the following adjustments should be made.

1. With no pin active in lane 20, BB should have .010" to .015" over the projection of BD. **TO ADJUST,** reposition Z on shaft Y.

REASON: To prevent interference of AIM on a normal machine operation.

2. The lip on rack BF should have no less than .010" clearance with the previous step of rack BE and at least .035" hold on the active step. **TO ADJUST,** move BD on Z as required.

REASON: To ensure indexing the proper fee amount.

CORRECTION KEYS

Correction keys are used to facilitate the reversal of entries and the making of corrections by the operator. The correction keys, when depressed, take precedence over carriage controlled

accumulator functions, thus indexing the accumulator functions. The correction entry is usually printed in red and, in some cases, is identified by an appropriate character in addition to the accumulator symbols.

CHECK CORRECTION KEY (CC), POSITION 1-A

The check correction key is used in bank applications to correct a check posting error or to return a check when an overdraft occurs. The check correction key, when depressed, indexes an add operation in accumulator "A", indexes a subtract operation in accumulator "B", and also indexes the red ribbon.

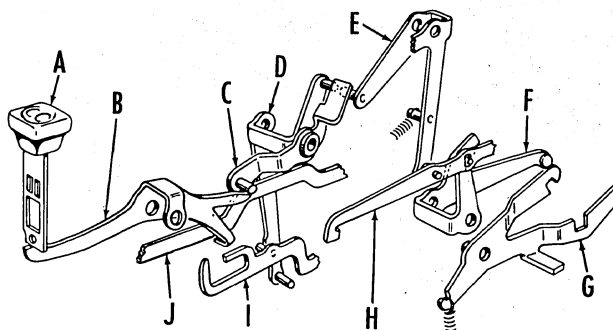


Fig. VII-37

As key A is depressed, the formed ear of lever B is rocked upward blocking the rearward movement of link J to disable the carriage controlled subtract operation of accumulator "A", thus indexing an add operation in accumulator "A". The rocking of lever B also indexes a subtract operation in accumulator "B" through arm C, lever E and link H rocking bail F which lowers the upper arm of meshing hook G into engagement with the square stud of the subtract/total control slide. The red ribbon mechanism is indexed from arm C through bellcrank D and link I.

DEPOSIT CORRECTION KEY (DC), POSITION 1-B

The deposit correction key is used in bank applications to correct a deposit posting error.

The deposit correction key, when depressed, indexes subtract operations in accumulators "A" and "B" and also indexes the red ribbon. In some styles of machines, a character is indexed to print between the "A" and "B" symbols; and in machines containing the Accumulator "B" Automatic Carry Count Mechanism, a subtract operation is indexed in the count section of accumulator "B".

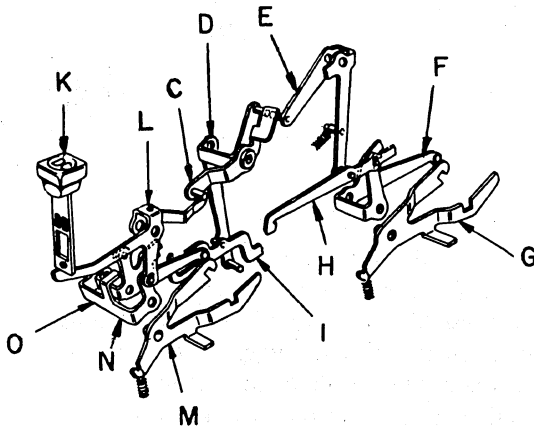


Fig. VII-38

As key K is depressed, bail N is rocked, through lever L and the formed ear of bail O, to lower the upper arm of meshing hook M into engagement with the square stud of the subtract/total control slide, thereby indexing a subtract operation in accumulator "A". The rocking of lever

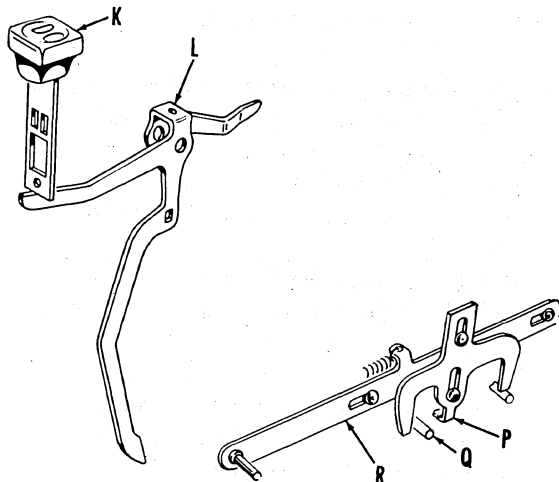


Fig. VII-39

er L also indexes a subtract operation in accumulator "B" through arm C, lever E and link H rocking bail F which lowers the upper arm of meshing hook G into engagement with the square stud of the subtract/total control slide. The red ribbon mechanism is indexed from arm C through bell-crank D and link I.

In machines containing the Accumulator "B" Automatic Carry Count Mechanism, depression of deposit correction key K moves slide R rearward, through the lower arm of lever L, to position the forward projection of slide P over stud Q to index a subtract carry in the count section of accumulator "B" if the count mechanism is active.

Tests and Adjustments

NOTE: Tests for Error Correction (EC) and Return Check (RET/CK) keys, positions 1-A and 2-A must be made prior to making the following adjustments.

A19-1-1 With the Deposit Correction key depressed:

A. Accumulator "B" meshing hook G should have at least a 3/4 hold on the square stud in the subtract/total control slide.

B. Link I should be moved forward fully without binding.

TO ADJUST, bend the rear arm of lever L.

REASON: To ensure full indexing of the red ribbon shift mechanism, and to index a subtract operation in accumulator "B".

A19-1-2 With the deposit correction key depressed, accumulator "A" meshing hook M should have at least a 3/4 hold on the square stud in the subtract/total slide.

TO ADJUST, bend the formed ear of bail O.

REASON: To ensure indexing a subtract operation in accumulator "A".

A19-1-3 With the deposit correction key depressed, the lower arm of lever L should position the forward projection of slide P over the forward stud Q of the whiffle tree.

TO ADJUST, bend the lower arm of lever L.

REASON: To ensure the indexing of a subtract carry in column 11 of accumulator "B".

ERROR CORRECTION (EC) AND RETURN CHECK (RET/CK) KEYS, POSITIONS 1-A AND 2-A

The error correction key is used in bank applications to correct a check posting error; and the return check key is used when an overdraft occurs and the check is returned.

The functions of the error correction and return check keys are the same. A different character is indexed and printed from each of the keys to identify the type of correction that is made. The error correction or return check keys, when depressed, index an add operation in accumulator "A", index a subtract operation in accumulator "B", index characters to print between the "A" and "B" symbols and also index the red ribbon.

In machines containing the Automatic Check Count Mechanism and the Accumulator "B" Automatic Carry Count Mechanisms, a subtract operation is indexed in the count sections (columns 10 through 14) of accumulators "A" and "B".

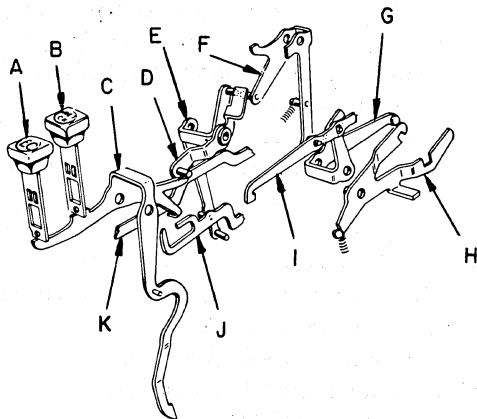


Fig. VII-40

As key A or B is depressed, the formed ear of lever C is rocked upward blocking the rearward movement of link K to disable the carriage controlled subtract operation of accumulator "A" thus indexing an add operation in accumulator "A". The rocking of lever C also indexes a subtract operation in accumulator "B" through arm D, lever F and link I rocking bail G which lowers the upper arm of accumulator "B" meshing hook H into engagement with the square stud of the subtract/total control slide. The red ribbon

mechanism is indexed from arm D through bell-crank E and link J.

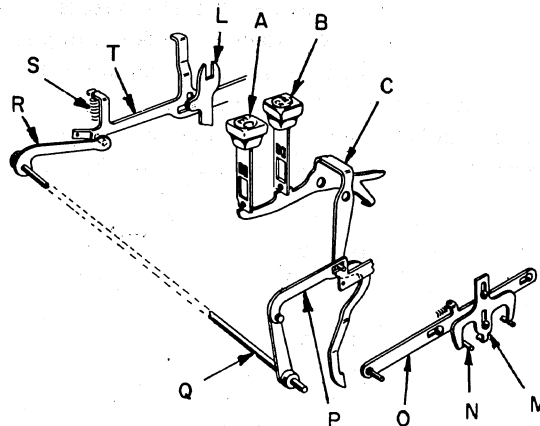


Fig. VII-41

In machines containing the Automatic Check Count Mechanism, depression of keys A or B rocks lever C to move arm P rearward rocking shaft assembly Q. Rocking of shaft assembly Q lowers arm R to permit spring S to lower link T, engaging the vertical slot of link T with the stud in arm L, thereby indexing a subtract operation in the count section of accumulator "A". The lower arm of lever C moves slide O rearward to position the forward projection of slide M over stud N to index a subtract carry in the count section of accumulator "B" if the Accumulator "B" Automatic Carry Count Mechanism is active.

Tests and Adjustments

A19-1 With the error correction or return check key depressed, manually raise the lane 6 ("A" total) sensing lever bellcrank. The meshing hook for crossfooter "A" should have at least a 3/4 hold on the square stud in the add control slide.

TO ADJUST, bend the formed ear of lever C.
REASON: To disable a carriage controlled subtract operation in accumulator "A".

A19-2 With the error correction or return check key depressed, link J should be fully moved forward without binding the ribbon shift mechanism in the machine sideframe.

TO ADJUST, tip the paddle on lever D.

REASON: To ensure indexing a subtract operation in accumulator "B".

A19-3 With error correction or return check key depressed, accumulator "B" meshing hook H should have at least a 3/4 hold on the square stud in the subtract/total control slide.

TO ADJUST, bend the arm of lever F to tilt its stud toward or away from the paddle of lever D. REASON: To ensure indexing a subtract operation in accumulator "B".

A19-4 With error correction or return check key depressed, the lower arm of lever C should position the forward projection of slide O over the forward stud N of the whiffle tree.

TO ADJUST, bend the lower arm of lever C.

REASON: To ensure indexing a subtract carry in column 11 of accumulator "B".

CHARACTERS EC, RT AND DC INDEXED FROM CORRECTION KEYS POSITIONS 1-A, 2-A AND 1-B TO PRINT BETWEEN THE "A" AND "B" SYMBOLS

To identify correction entries, characters are indexed from the error correction, return check and deposit correction keys. Characters EC, RT and DC are printed between the accumulator "A" and "B" symbols from the same type bar used to print the characters indexed from keys in column "O". Characters indexed from

the correction keys take precedence over characters indexed from keys in column "O".

Depression of return check key O rocks lever J to position the lower step on the rearward arm of lever J into the path of stud C. Early in the machine cycle, as shaft A is swung rearward, the spring on index rack P moves index strip Q rearward and swings index rack P and bail B rearward. Bail B, through stud C, limits on the lower step of lever J to position the foremost step of index rack P below the path of the formed ear of rack D, thus permitting rack D to raise the character (RT) in type position 12 into printing position through the cluster gear unit. With return check key O depressed, rack D, through eccentric H, limits on guide comb F to ensure that stud in latch I will enter the tooth space of lock plate E without binding.

Depression of error correction key N rocks lever M to contact the inner step of the formed ear on lever J and position the center step on the rearward arm of lever J into the path of stud C. As index rack P and bail B are swung rearward, stud C limits on the center step of lever J to position the last step of index rack P into the path of the formed ear of rack D, thus permitting rack D to raise the character (EC) in type position 11 into printing position.

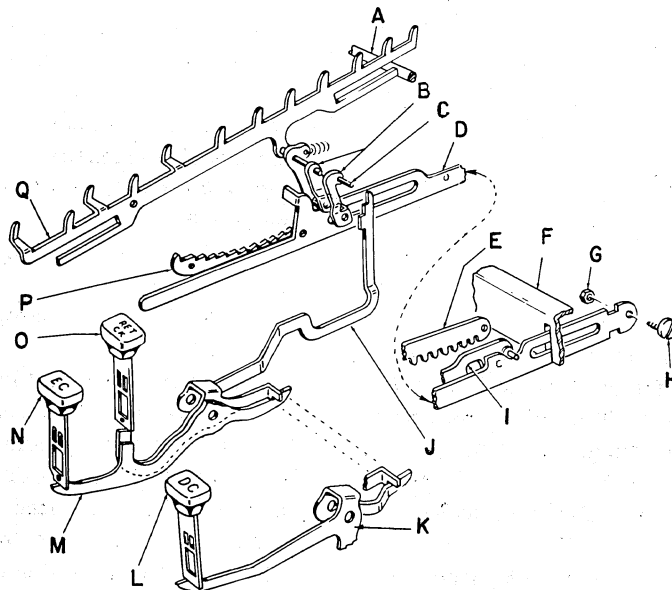


Fig. VII-42

Depression of deposit correction key L rocks lever K to contact the outer step of the formed ear on lever J and position the upper step on the rearward arm of lever J into the path of stud C. As index rack P, and bail B are swung rearward, stud C limits on the upper step of lever J to position the next to last step of index rack P into the path of the formed ear of rack D, thus permitting rack D to raise the character (DC) in type position 10 into printing position.

Depression of keys in column "O" indexes characters in type positions 1 through 9 in the normal manner. If a key in column "O" and a correction key are depressed, index rack P, through bail B and stud C, limits on the step of lever J prior to index strip Q limiting on the depressed keystem in column "O", thus permitting printing of characters from the correction keys to take precedence over printing of characters from keys in column "O".

Tests and Adjustments

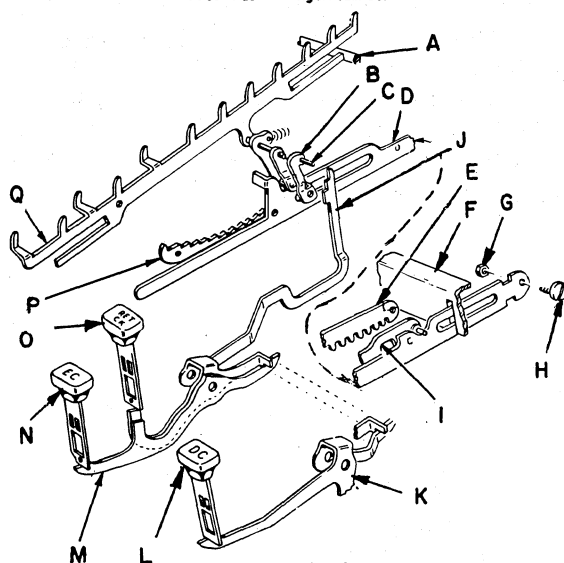


Fig. VII-43

PR12-1 With Motor Bar No. 2 depressed and the drive tripped, cycle the machine until shaft A is completely rearward. The slot in index strip Q should limit against the guide comb.

TO ADJUST, weave bail B.

REASON: To permit full index of sector indexor P.

PR12-2 With the Error Correction key depressed, the rearward arm of lever M should have at least a full hold on the inner step of the formed ear on lever J.

TO ADJUST, bend lever M.

REASON: To ensure correct indexing of lever J from depression of the Error Correction key.

PR12-3 With the Deposit Correction key depressed, the rearward arm of lever K should have at least a full hold on the outer step of the formed ear on lever J.

TO ADJUST, bend lever K.

REASON: To ensure correct indexing of lever J from depression of the Deposit Correction key.

PR12-4 With the Deposit Correction key depressed, operate the machine manually. Stud C in bail B should limit on the upper step of lever J.

With the Error Correction key depressed, operate the machine manually. Stud C in bail B should limit on the center step of lever J.

With the Return Check key depressed, operate the machine manually. Stud C in bail B should limit on the lower step of lever J.

TO ADJUST, bend lever J to raise or lower the steps.

REASON: To index the correct limit for stud C when a correction key is depressed.

PR12-5 With the Deposit Correction key depressed, operate the machine manually. The formed ear of adding rack D should have no less than 2/3 hold on the next to the last step of sector indexor P.

With the Error Correction key depressed, operate the machine manually. The formed ear of adding rack D should have no less than 2/3 hold on the last step of sector indexor P.

With the Return Check key depressed, operate the machine manually. The formed ear on adding rack D should clear the last step of sector indexor P.

TO ADJUST, bend the step portion of lever J forward or rearward.

REASON: To ensure correct indexing of sector indexor P.

PR12-6 With the Return Check key depressed, operate the machine manually. The stud in adding rack latch I should enter the tooth space of lock plate E without binding against the front or rear of the tooth space.

TO ADJUST, turn eccentric H.

REASON: To ensure free entry of the stud in adding rack latch I into the tooth space of lock plate E.

CREDIT CORRECTION KEY (CR/COR), POSITION 1-A

Tests and Adjustments

The credit correction key is used in cycle billing applications to correct a credit posting error. The credit correction key, when depressed indexes an add operation in accumulator "A", indexes subtract operations in accumulators "B" and "C", and blocks the red ribbon.

As credit correction key A is depressed, the formed ear of lever B is rocked upward blocking the rearward movement of link P to disable the carriage controlled subtract operation of accumulator "A", thus indexing an add operation in accumulator "A". The rocking of lever B also indexes a subtract operation in accumulator "C" through the lip of bail C rocking lever D, link H and bail I, which lowers the upper arm of accumulator "C" meshing hook J into engagement with the square stud in the subtract/total control slide. The rocking of lever D also indexes a subtract operation in accumulator "B" through the formed ear of lever D, lever E and link O rocking bail M, which lowers the upper arm of accumulator "B" meshing hook L into engagement with the square stud of the subtract/total control slide. The red ribbon mechanism is blocked through the rocking of bail C, which allows spring N to pull link K forward positioning the step of bail F in the path of stud G.

A19-2-1 With the credit correction key depressed, manually raise the lane 6 (A Total) sensing lever bellcrank. The add meshing hook for crossfooter "A" should have at least a 3/4 hold on the square stud in the add control slide. TO ADJUST, bend the formed ear of lever B. REASON: To disable a carriage controlled subtract operation of accumulator "A".

A19-2-2 With the credit correction key depressed, the accumulator "C" meshing hook J should have at least a 3/4 hold on the square stud in the subtract/total control slide. TO ADJUST, tip the paddle on bail C. REASON: To ensure indexing a subtract operation in accumulator "C".

A19-2-3 With the credit correction key depressed, the accumulator "B" meshing hook L should have at least a 3/4 hold on the square stud in the subtract/total control slide. TO ADJUST, bend the arm of lever E. REASON: To ensure indexing a subtract operation in accumulator "B".

A19-2-4 With the credit correction key depressed, there should be .010" to .015" clearance between the upper angle of the step on bail F and stud G. TO ADJUST, weave bail F. REASON: To ensure printing the correction entry in black.

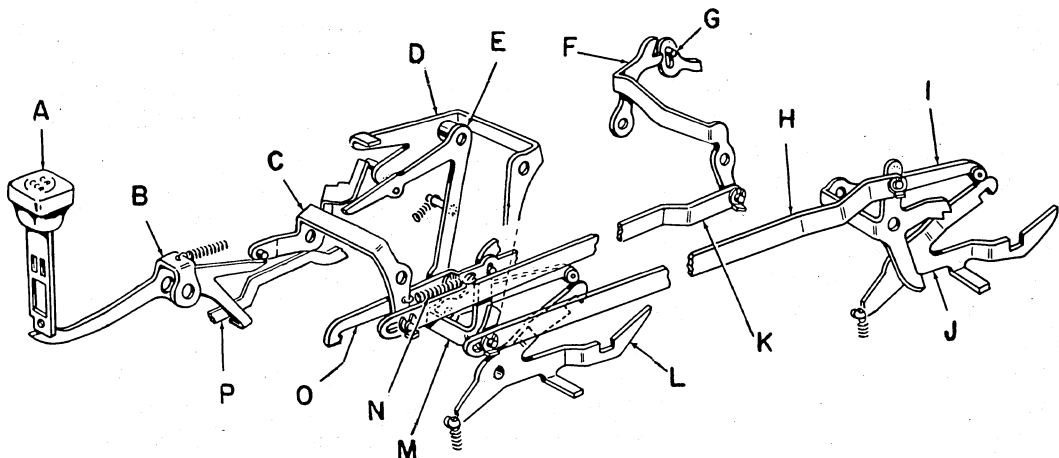


Fig. VII-44

PURCHASE CORRECTION KEY (PUR/COR), POSITION 1-B

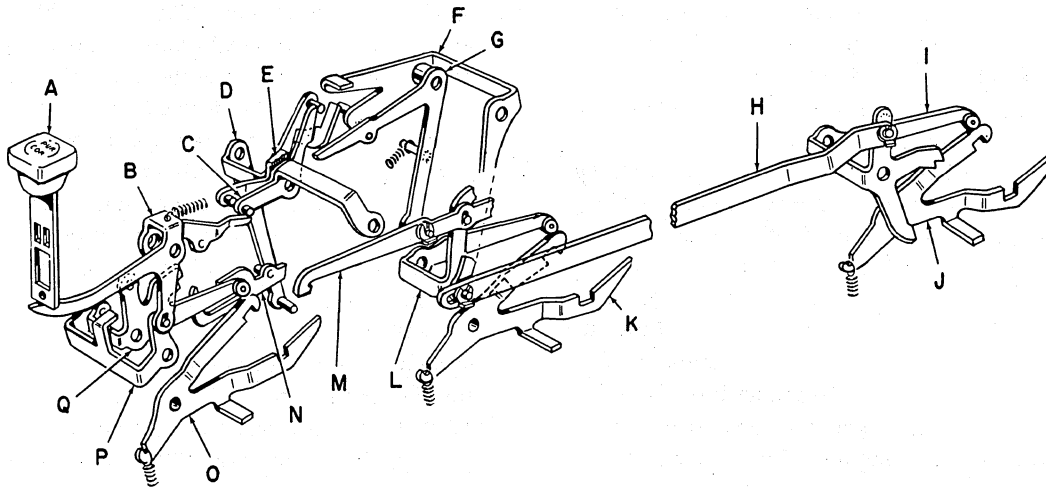


Fig. VII-45

The purchase correction key is used in cycle billing applications to correct a purchase posting error. The purchase correction key, when depressed, indexes subtract operations in accumulators "A", "B" and "C" and also indexes the red ribbon.

As purchase correction key A is depressed, bail Q is rocked, through lever B and the formed ear of bail P, to lower the upper arm of accumulator "A" meshing hook O into engagement with the square stud in the subtract/total control slide, thereby indexing a subtract operation in accumulator "A". The rocking of lever B also indexes a subtract operation in accumulator "C" through bail C rocking bail E. The lip of bail E rocks lever F, link H and bail I, which lowers the upper arm of accumulator "C" meshing hook J into engagement with the square stud in the subtract/total control slide. The rocking of lever F also indexes a subtract operation in accumulator "B" through the formed ear of lever F, lever G and link M rocking bail L, which lowers the upper arm of accumulator "B" meshing hook K into engagement with the square stud in the subtract/total control slide. The red ribbon mechanism is indexed from bail C through bellcrank D and link N.

Tests and Adjustments

NOTE: Tests for Credit Correction (CR/COR) key, Position 1-A, must be made prior to making the following adjustments.

A19-3-1 With the purchase correction key depressed, accumulator "B" and "C" meshing hooks K and J should have at least a 3/4 hold on the square stud in the subtract/total control slide.

TO ADJUST, bend the rear arm of lever B.
REASON: To ensure indexing a subtract operation in accumulators "B" and "C".

A19-3-2 With the purchase correction key depressed, link N should be positioned fully forward without binding.

TO ADJUST, recheck A19-3-1.
REASON: To ensure full indexing of the red ribbon shift mechanism.

A19-3-3 With the purchase correction key depressed, accumulator "A" meshing hook O should have at least a 3/4 hold on the square stud in the subtract/total control slide.

TO ADJUST, bend the formed ear of bail P.
REASON: To ensure indexing a subtract operation in accumulator "A".

OLD BALANCE CORRECTION KEY (OB/COR), POSITION 5-B

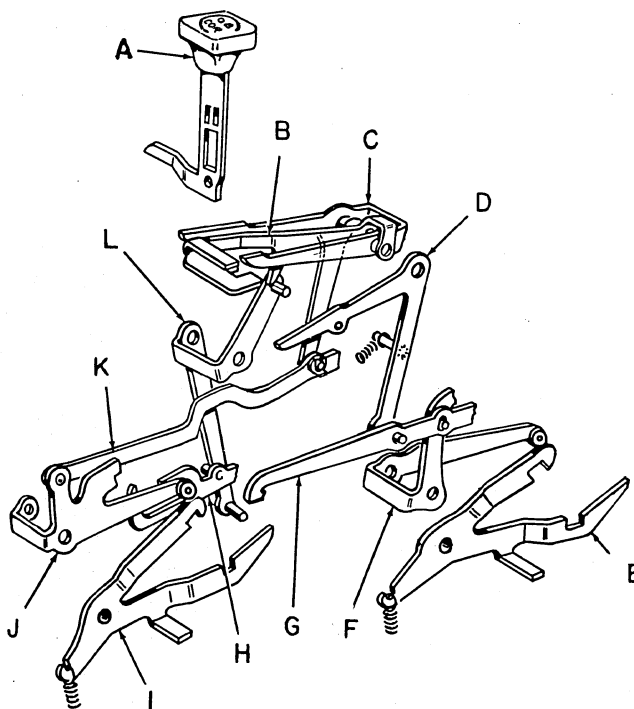


Fig. VII-46

Tests and Adjustments

The old balance correction key is used in cycle billing applications to correct an error made in picking up an old balance. The old balance correction key, when depressed, indexes subtract operations in accumulators "A" and "B" and also indexes the red ribbon.

As old balance correction key A is depressed, bail J is rocked, through lever C and link K, to lower the upper arm of accumulator "A" meshing hook I into engagement with the square stud in the subtract/total control slide, thereby indexing a subtract operation in accumulator "A". Old balance correction key A also rocks bail F, through lever D and link G, to lower the upper arm of accumulator "B" meshing hook E into engagement with the square stud in the subtract/total control slide, thereby indexing a subtract operation in accumulator "B". The red ribbon mechanism is indexed from depression of key A through lever B, bellcrank L and link H.

A19-4-1 With the old balance correction key depressed, accumulator "A" meshing hook I should have at least a 3/4 hold on the square stud in the subtract/total control slide.
TO ADJUST, weave the outer arm of bail C.
REASON: To ensure indexing a subtract operation in accumulator "A".

A19-4-2 With the old balance correction key depressed, accumulator "B" meshing hook E should have at least a 3/4 hold on the square stud in the subtract/total control slide.
TO ADJUST, bend the upper arm of lever D.
REASON: To ensure indexing a subtract operation in accumulator "B".

A19-4-3 With the old balance key depressed, link H should be moved fully forward without binding.

TO ADJUST, bend the formed ear of B.
REASON: To ensure full indexing of the red ribbon shift mechanism.

CHARACTERS CR, PC AND BC INDEXED FROM CORRECTION KEY POSITIONS 1A, 1B AND 5B TO PRINT BETWEEN THE A AND B SYMBOLS

To identify correction entries, characters are indexed from credit correction, purchase correction and old balance correction keys. Characters CR, PC and BC are printed between accumulators A and B symbols from the same type bar used to print the characters indexed from keys in columns "O". The correction key characters take precedence over column "O".

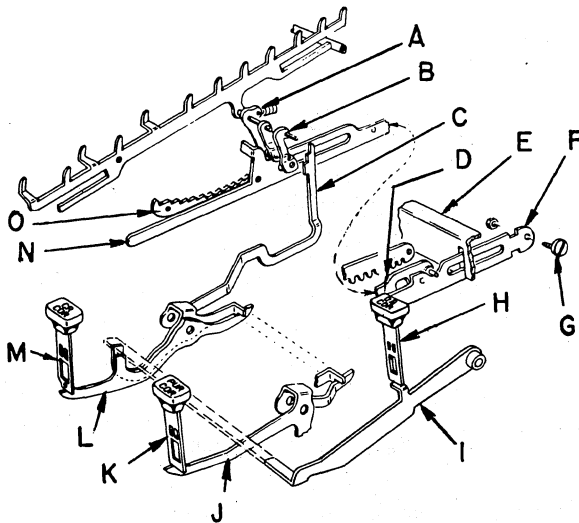


Fig. VII-47

Depression of old balance correction key H rocks lever I to contact the forward projection of lever C and position the lower step on the rear-most arm of lever C into the path of stud B. Early in the machine cycle, as stud B is swung rearward, the spring on index rack O moves index rack O and bail A rearward. Bail A, through stud B, limits on the lower step of lever C to position the foremost step of index rack O below the path of the formed ear of rack N, thus permitting rack N to raise the character (BC) in type position 12 into printing position through the cluster gear unit. With the old balance correction key depressed, rack F, through eccentric G, limits on guide comb E to ensure that the stud in latch will enter the tooth space of the lock plate without binding.

Depression of credit correction key M rocks lever L to contact the inner step of the formed ear of lever C and position the center step on the rearmost arm of lever C into the path of stud B.

As index rack O and bail A are swung rearward, stud B limits on the center step of lever C to position the last step of index rack O into the path of the formed ear of rack N, thus permitting rack N to raise the character (CR) in type position 11 to printing position.

Depression of purchase correction key K rocks lever J to contact the outer step of the formed ear on lever C and position the upper step on the rearmost arm of lever C into the path of stud B. As index rack O and bail A are swung rearward, stud B limits on the upper step of lever C to position the next to last step of index rack O into the path of the formed ear of rack N, thus permitting rack N to raise the character (PC) in type position 10 to printing position.

Depression of keys in column "O" indexes characters in type positions 1 through 9 in the normal manner. If a key in column "O" and a correction key are both depressed, index rack O, through bail A and stud B, limits on the step of lever C prior to the index strip limiting on the depressed keystem in column "O", thus permitting printing of characters from the correction keys to take precedence over printing of characters from column "O".

Tests and Adjustments

PR16-1 With credit correction key depressed, the arm of lever L should have at least a full hold on the inner step of the formed ear of lever C. TO ADJUST, bend the ear of lever C as required.

REASON: To ensure correct indexing of lever C from depression of the credit correction key.

PR16-2 With purchase correction key depressed, the arm of lever J should have at least a full hold on the outer step of the formed ear on lever C.

TO ADJUST, bend the arm of lever J as required.

REASON: To ensure correct indexing of lever C from depression of the purchase correction key.

PR16-3 With purchase correction key K depressed, operate the machine manually. Stud B in bail A should limit on the center step of lever C.

TO ADJUST, bend lever C as required.

REASON: To index the correct limit for stud B in bail A when the purchase correction or credit

correction key is depressed.

PR16-4 With old balance correction key depressed, operate machine manually. Stud B in bail A should limit on the lower step of lever C. TO ADJUST, bend lever I to tip its forward formed ear as required.

REASON: To index the correct limit for stud B in bail A when the old balance correction key is depressed.

PR16-5

A. With purchase correction key K depressed, operate machine manually. The formed ear of rack N should have no less than a 2/3 hold on the second to last step of index rack O.

B. With credit correction key M depressed, operate machine manually. The formed ear of rack N should have no less than a 2/3 hold on the last step of index rack O.

C. With old balance correction key H depressed, operate machine manually. The formed ear of rack N should clear the last step of index rack O.

TO ADJUST, bend step portion of lever C as required.

REASON: To ensure correct indexing of index rack O.

PR16-6 With old balance correction key H depressed, operate machine manually. The stud in latch D should enter the tooth space of the lock plate without binding against the front or rear of the tooth space.

TO ADJUST, rotate eccentric G as required.

REASON: To ensure free entry of the stud in latch D in the tooth space of the lock plate.

COUNTER DIAL MECHANISMS

Counter dials are used to count certain items, functions or machine operations during a posting run, thus providing activity counts that may be used for audit control purposes. The counter dials which are located in the front panel of the machine case, have a capacity of 99999 and are equipped with a knurled wheel to reset the counters to 00000. When more than one counter dial is used, the first counter on the right is referred to

as counter dial No. 1, the second from right No. 2, etc.

Advancing of the counter dials may be controlled from carriage controls; from carriage controls and selection of proper registers; or from carriage controls, register selection and depression of amount keys.

Advancing the Counter Dial

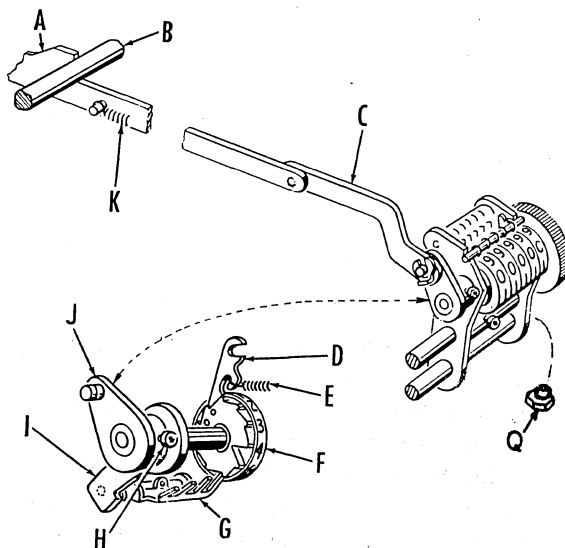


Fig VII-48

The counter dial is indexed to advance when adding rack actuating shaft B moves forward, permitting spring K to move counter dial slide A and link C forward. Forward movement of link C rocks arms J and I to move advancing bail G rearward to locate the first finger of bail G into a tooth space of dial wheel F. As actuating shaft B and counter dial slide A move rearward, advancing bail G is rocked forward, through arms J and I, thus advancing dial wheel F one digit.

If dial wheel F is positioned at 9, the first finger of bail G drops into a deeper tooth space of dial wheel F to allow the second finger of bail G to contact the tooth space of the second dial wheel, thus permitting both dial wheels to be advanced one digit and effect a carry. If the first two dial wheels are positioned at 9, the third wheel will be advanced one digit, etc.

Dial wheels F are held in position by detents D and springs E.

Resetting the Counter Dial

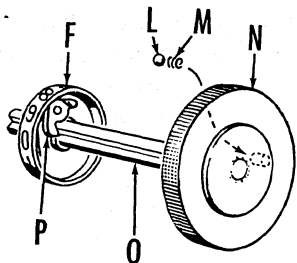


Fig. VII-49

Resetting of the counter dial is accomplished by rotating reset wheel N with the thumb or forefinger. Rotation of reset wheel N rotates shaft O, which, through its V-shaped groove, picks up pawl P to rotate dial wheel F to normal. Pawl P is held in contact with shaft O under spring tension.

Detent ball L, under tension of spring M, seats in a hole in the counter dial assembly side-frame to hold the reset wheel in normal position while the counter dial is being advanced.

The counter dial reset wheel is sometimes disabled to prevent manipulation of the dials by unauthorized persons, thereby providing a continuous count. The reset wheel is disabled by omitting pawls P.

Tests and Adjustments

A18-1 The distance between the right side frame and the right bracket of the counter dial frame assemblies for the counter dials are as follows:

Counter No. 1 $34/64$ "

Counter No. 2 $2 \frac{3}{32}$ "

Counter No. 3 $4 \frac{25}{32}$ "

TO ADJUST, loosen bristo screws in counter assemblies and adjust counters as required.

REASON: To permit free rotation of the reset wheels when front case panel is assembled to machine.

A18-2 With the machine and dial slide A normal, bail G should be rocked upward until the first finger advances and fully detents the first dial wheel F. At this point, visually check for approximately .015" clearance between the first finger of bail G and the last active tooth of wheel F.

TO ADJUST, loosen bristo screw and locate bail G as required.

NOTE: Operate machine electrically and check for underthrow or overthrow of dial wheels.

REASON: To ensure advancing the counter dials correctly.

A18-3 With the machine normal, reset wheel N should not bind on the front case panel.

TO ADJUST, starting with the high side of eccentric Q in the counter dial frame at 11 o'clock rotate the eccentric as required.

NOTE: After adjusting check for clearance of the stud in the front end of register "B" count rack and count disabling arm.

REASON: To ensure proper function of the counter dial mechanism.

A18-4 NOTE: Manually position counter dials F as shown in the upper line. Operate machine electrically to advance first right hand counter dial one tooth, results should be as shown on lower line.

00009	00099	00999	09999	99999
00010	00100	01000	10000	00000

REASON: To ensure proper carry of counter dials.

COUNTER DIAL INDEXED TO ADVANCE FROM CARRIAGE CONTROLS, LANE 17

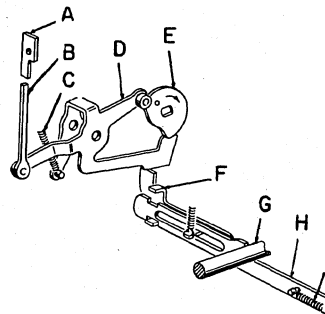


Fig. VII-50

To permit advancing the counter dial, the carriage controls must be active with a No. 7 control pin in lane 17.

Early in the machine cycle as sensing cam E is rotated, spring C rocks lever D, which, through tappet B, limits on No. 7 control pin A. Rocking of lever D moves the lower formed ear of arm F out of the notch in counter dial slide A.

As the operation continues and adding rack actuating shaft G moves forward, spring I moves slide H forward to position the counter dial advancing bail in active position to permit advancing the counter dial when actuating shaft G

moves slide H rearward.

When the machine is operated with the carriage controls active and no pin in lane 17, spring C rocks lever D farther to move the upper formed ear of arm F into the upper notch in slide H to prevent slide H from moving forward, thus effecting non-counting.

During a machine operation in which the carriage controls are disabled, the lower formed ear of arm F will remain in the lower notch of slide H to effect non-counting.

Tests and Adjustments

A18-1-1 With the machine normal the lower formed ear on detent F should block count slide H.

With no control pin active in lane 17, cycle the machine to approximately 70° . The upper formed ear of detent F should block count slide H. With a No. 7 pin active in lane 17, cycle the machine to approximately 70° . Detent F should be lowered to its inactive position to permit count slide H to be moved forward.

TO ADJUST, bend the lower lip of D.

REASON: To ensure or prevent indexing slide H.

COUNTER DIAL INDEXED TO ADVANCE FROM CARRIAGE CONTROLS, LANE 24

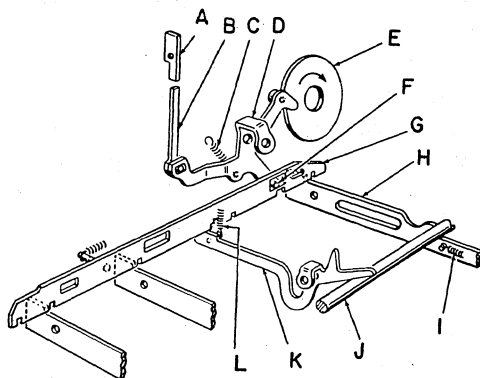


Fig. VII-51

To permit advancing the counter dial(s), the carriage controls must be active with a No. 4 control pin in lane 24.

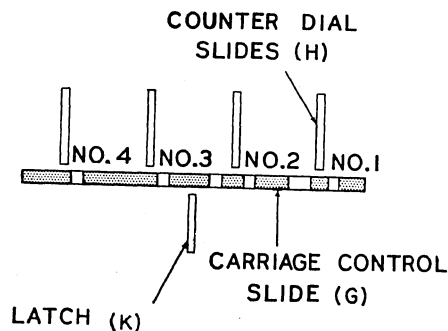


Fig. VII-52

With the machine normal, the cutouts in slide G are located to the right of counter dial slides H.

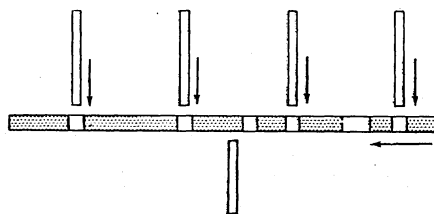


Fig. VII-53

Early in the machine cycle as sensing cam E is rotated, spring C rocks bellcrank D, which, through tappet B, limits on No. 4 control pin A. Rocking of bellcrank D moves slide G to the left, through stud F, to align the cutouts in slide G with counter dial slides H.

As the operation continues and actuating shaft J moves forward, springs I move slides H forward to position the counter dial advancing fingers in active position to permit advancing the counter dials when actuating shaft J moves slides H rearward.

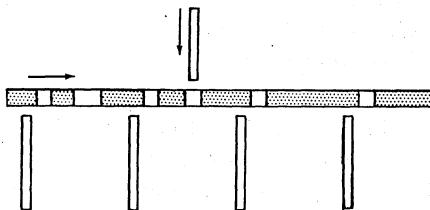


Fig. VII-54

When the machine is operated with the carriage controls active and no pin in lane 24, bellcrank D, through stud F, moves slide G to its

leftmost position, blocking slides H to prevent advancing the counter dials. As actuating shaft J moves forward, spring L swings latch K into a cutout in slide G to prevent restoration of slide G and possible release of counter dial slides H until actuating shaft J has returned to normal.

During a machine operation in which the carriage controls are disabled, slide G is retained in normal position blocking slides H to prevent advancing the counter dials.

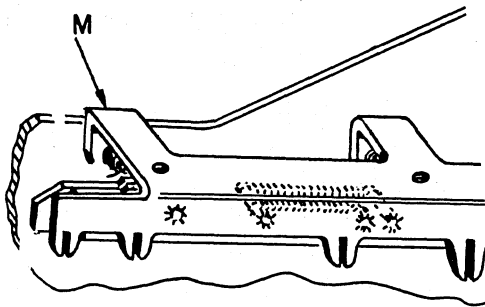


Fig. VII-55

A14-1 With the carriage control lever forward and no pin active in lane 24, cycle the machine to approximately 130° . Count slide(s) H should have a $3/4$ hold on cross slide G.

TO ADJUST, bend bracket M up or down.

REASON: To ensure blocking the count slides when the count mechanism is not indexed.

A14-2 With the carriage control lever forward and a No. 4 pin active in lane 24, cycle the machine to approximately 130° . Cross slides G should be positioned to align their cutouts with count slides H.

TO ADJUST, position bracket M laterally.

REASON: To ensure proper indexing of the cross slides.

A14-3 With the carriage control lever forward and no control pin active in lane 24, cycle the machine to approximately 130° . Cross slides G should be positioned to block the forward movement of count slides H.

TO ADJUST, recheck A14-2.

REASON: To ensure blocking the count slides.

A14-4 With the carriage control lever forward and no control pin active in lane 24, cycle the machine to approximately 130° . With cross slides G indexed, detent K should engage the

deep step of the slot in the cross slides.

TO ADJUST, reposition detent K.

REASON: To prevent premature restoration of the cross slides and possible release of the count slides.

A14-5 With the carriage control lever forward and a No. 4 pin active in lane 24, cycle the machine to approximately 130° . Detent K should engage the half step of the slot in cross slide G.

TO ADJUST, recheck adjustment A14-2.

REASON: To prevent premature restoration of the cross slides and possible release of the count slides.

COUNT CONTROLLED FROM AMOUNT KEY DEPRESSION

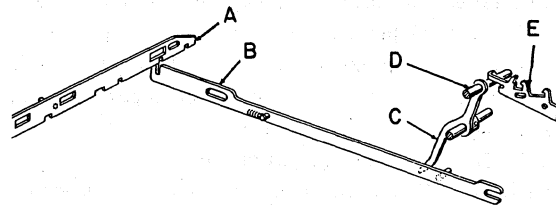


Fig. VII-56

If the counter dials are controlled to advance only when amount keys are depressed in addition to having carriage controls active in lane 24, an additional slide A is used in conjunction with the carriage controlled slide J (Fig. 4).

When amount keys are depressed and the drive is tripped, locking strip E limits on the depressed keystem and restricts the movement of shaft D and arm C, thereby allowing the rearward projection of blocking slide B to remain clear of slide A.

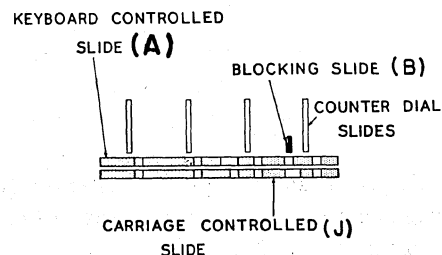


Fig. VII-57

With the machine normal, the cutouts in keyboard controlled slide A are located to the right of the projections on the rear of the counter dial slides, thus blocking forward movement of the counter dial slides unless slide A is moved to the left.

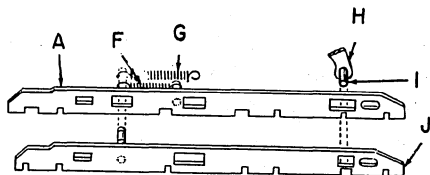


Fig. VII-58

Keyboard controlled slide A is moved to the left, through spring F, when bellcrank H and stud I move carriage controlled slide J to the left through carriage controls in lane 24. Slides J and A are restored to normal through spring G.

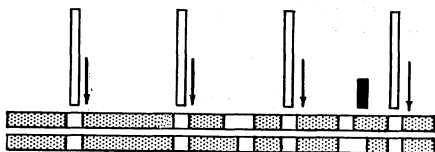


Fig. VII-59

When the machine is operated with amount keys depressed and a No. 4 control pin active in lane 24, slides J and A are moved to the left to align their cutouts with the counter dial slides to index advancing of the counter dial(s).

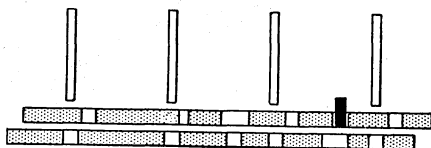


Fig. VII-60

If no amount keys are depressed and the drive is tripped, locking strip E and shaft D allow arm C to move blocking slide B forward to block the movement of slide A, through the rearward projection of slide B, thus blocking forward movement of the counter dial slides to prevent advancing the counter dials.

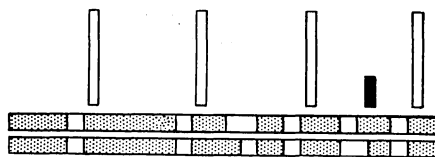


Fig. VII-61

When the machine is operated with amount keys depressed and no control pin in lane 24, slides J and A are moved to their leftmost positions, blocking the counter dial slides to prevent advancing the counter dials.

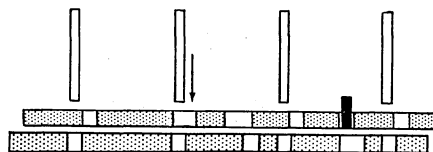


Fig. VII-62

If one counter dial is to advance with or without amount keys depressed while the others advance only when amount keys are depressed, a wider cutout is used in slide A so that the cutout will be aligned with the counter dial slide regardless of whether or not slide A is moved to the left. A longer slot in slide A for stud I permits carriage controlled slide J to be moved to the left from carriage controls, thus permitting the counter dial slide to move forward to advance the counter dial.

Tests and Adjustments

A14-1-1 NOTE: With amount keys depressed and the drive tripped, there should be no less than .005" clearance between the rear projection on slide B and cross slide A.

REASON: To permit indexing of the cross slides.

A14-1-2 With no amount keys depressed and the drive tripped, the rear projection on slide B should move forward to have a full hold on cross slide A.

TO ADJUST, bend arm C on shaft D.

REASON: To prevent indexing the cross slide.

COUNT CONTROLLED FROM REGISTER SELECTION, SERIES F200 AND F400

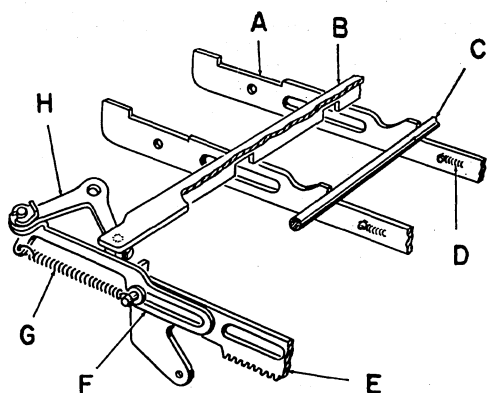


Fig. VII-63

In addition to carriage control and amount key depression control, advancing of the counter dial(s) may be controlled from selection of registers. An additional slide B, with cutouts arranged to allow counter dial slides A to be moved forward only when the proper register is selected, is used to control advancing of the counter dials from register selection.

When a particular register is selected, forward movement of register selection rack E moves slide B to the right, through link F, spring G and arm H, to either align a cutout in slide B with counter dial slides A or to block slides A - depending upon the arrangement of the cutouts in slide B.

With a cutout in slide B aligned with counter dial slide A, forward movement of adding rack actuating shaft C permits spring D to move slide A forward to position the counter dial advancing bail in active position to permit advancing the counter dial when actuating shaft C moves slide A rearward.

Tests and Adjustments

A18-4-1 When a register is selected to index a count, the cutouts in limit slide B should be aligned with the counter dial slides A. When a register is selected that is not to index a count, the counter dial slides A should be blocked from moving forward by limit slide B. TO ADJUST, recheck register selection adjustment.

REASON: To ensure proper indexing of the counter dials from register selection.

COUNT CONTROLLED FROM REGISTER SELECTION, SERIES F300 AND F500

This mechanism is used when multiple counter dials are to be controlled from register selection on Series F300 and F500 machines. Advancing of the counter dials may also be controlled from amount key depression and carriage controls in lane 24.

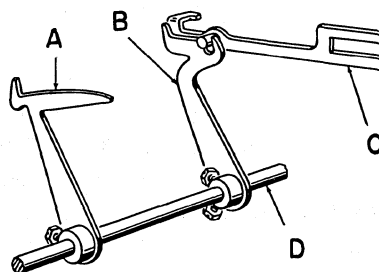


Fig. VII-64

The counter dials are indexed to advance from selection of specified registers when forward movement of register indexing rack C rocks shaft assembly D and indexing arms A through arm B.

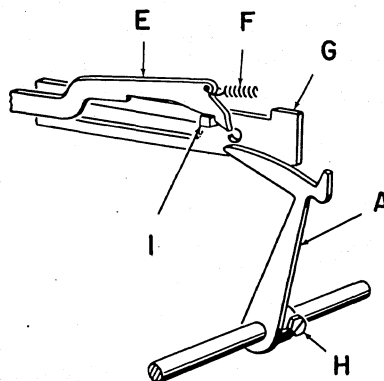


Fig. VII-65

When a register is selected that is to index a count, a projection on arm A is positioned under the rear point of arm E. As counter dial slide G moves forward, stud I moves away from the inclined surface of arm E permitting spring F to lower arm E to limit on the projection of arm A.

With arm E limiting on the projection of arm A, stud I clears under the forward step of arm E to allow counter dial slide G to move forward to advance the counter dial.

If a register is selected that does not position a projection of arm A in line with the rear point of arm E, spring F lowers arm E to limit on the horizontal portion of arm A, thus positioning the step of arm E into the path of stud I to limit the forward travel of counter dial slide G and prevent advancing the counter dial.

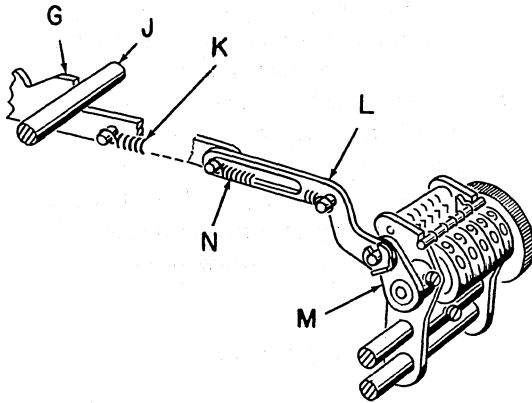


Fig. VII-66

Spring N and the slot in link L permit spring K to move counter dial slide G forward to limit on the step of arm E without advancing the counter dial - if a register is selected that is not to index a count. If a register is selected that indexes a count, counter dial slide G clears the step on arm E and moves farther forward to move link L forward rocking arm M to position the counter dial advancing bail into active position to permit advancing the counter dial when actuating shaft J moves slide G and link L rearward.

Tests and Adjustments

NOTE: Tests for Advancing the Counter Dials, Dial Count Mechanism Carriage Controlled Lane 24 and Count Controlled from Amount Key Depression must be made prior to making the following test.

A18-5-1 With a No. 4 control pin active in lane 24, amount keys depressed and a register selected to index a count, manually operate the ma-

chine to approximately 110° . The upper projection on arm A should be positioned directly under the point of limit arm E.

TO ADJUST, loosen screw H and reposition arm A.

REASON: To ensure advancing the counter dial when a specified register is selected.

FULL HAMMERBLOCK SELECTED WHEN THE RIBBON IS SHIFTED TO RED

This mechanism enables the ribbon shift mechanisms to select printing position No. 2 when the ribbon is raised to red printing position in a carriage position where printing position No. 1 is normally selected from carriage controls.

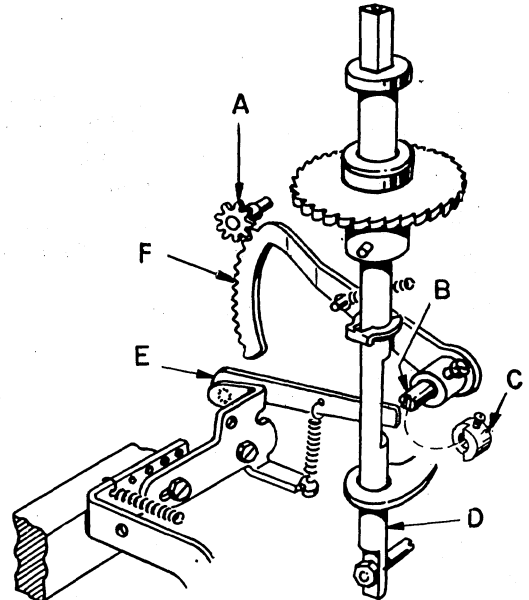


Fig. VII-67

When ribbon post D is raised to lift the black portion of the ribbon into printing position, sector F is free to rotate printing control shaft A to any position indexed by the carriage control.

When ribbon post D is raised to lift the red portion of the ribbon into printing position, arm E is raised by the cutout in the ribbon post to align with the flat on collar C. Thus, when sector F is moved to select a printing control position, the flat of collar C will limit on the end of arm E to limit the movement of sector F to printing control position No. 2.

Tests and Adjustments

PR10-1 Arm E should have a safe lateral hold on the cutout of ribbon post D.

TO ADJUST, bend arm E.

REASON: To ensure actuating arm E when ribbon post D is raised to red position.

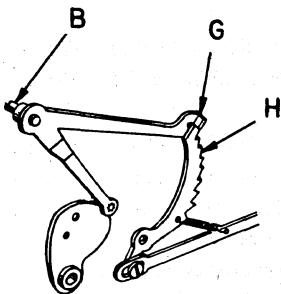


Fig. VII-68

PR10-2 Using the subtract motor bar to index the red ribbon, manually cycle the machine to approximately 120° . Movement of sector F should be limited to printing position No. 2 by the flat of collar C contacting the end of arm E, when index rack H is rocked clear of formed ear G.

NOTE: When arm E is limiting the movement

of sector F the No. 2 step of index rack H should have .010" clearance under formed ear G.

TO ADJUST, rotate collar C on shaft B, maintaining a full lateral hold on arm E.

REASON: To ensure selecting printing position No. 2 when red ribbon is indexed in a carriage position that has a No. 1 printing control programmed.

CARRIAGE OPENING INDEXED FROM DEPRESSION OF MOTOR BAR NO. 3

This feature provides a carriage opening operation each time motor bar No. 3 is indexed. In a carriage position where multiple items are posted and each item is printed on a separate form, this feature allows the operator to insert and remove the forms after each item is printed.

Depression of motor bar No. 3 rocks carriage opening bail C through the stud in link A. The rocking of bail C lowers carriage opening slide B to active position.

Tests and Adjustments

C18-1 With motor bar No. 3 depressed, carriage opening slide B should be fully indexed but should not bind.

TO ADJUST, weave bail C.

REASON: To ensure carriage opening from depression of motor bar No. 3.

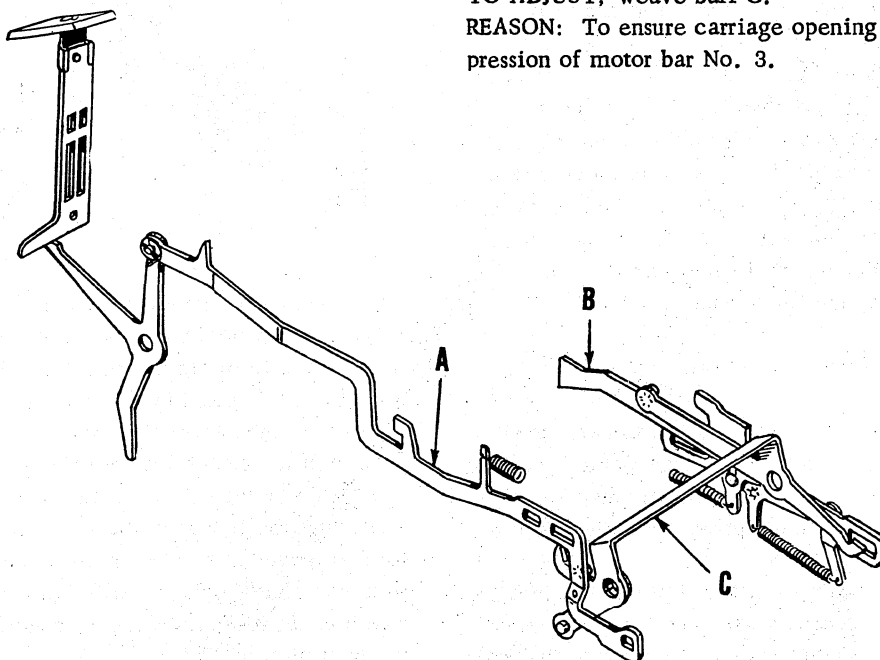


Fig. VII-69

**CARRIAGE OPENING DISABLED DURING
CROSSFOOTER "A" PLUS TOTAL OPERATIONS
WHEN THE AMOUNT EXCEEDS \$.99**

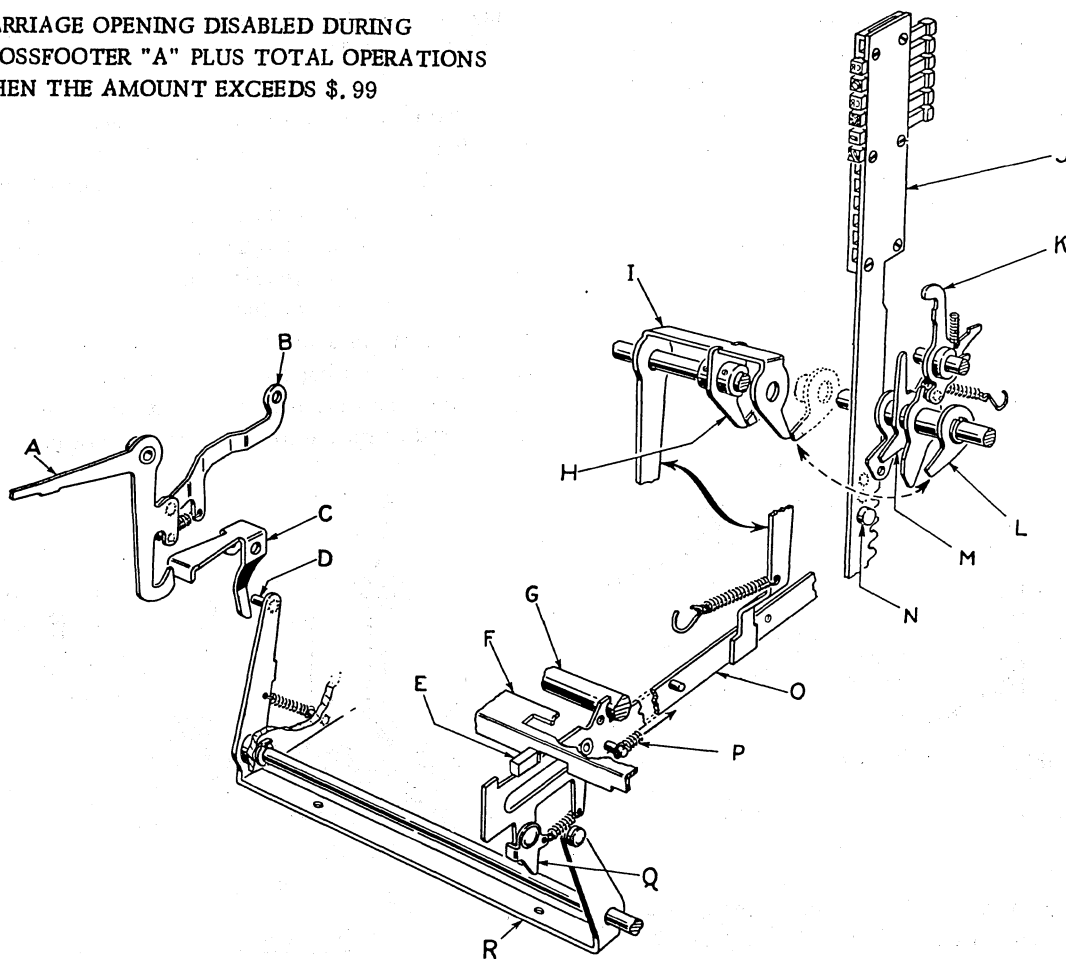


Fig. VII-70

This mechanism is used in cycle billing applications to enforce recognition of past due accounts. The carriage controlled carriage opening mechanism is disabled during crossfooter "A" plus total operations when the amount exceeds \$.99, thus informing the operator that the account is past due. The carriage must then be opened manually to remove the ledger card.

The carriage opening mechanism is disabled only if registers 2, 3 or 4 are active during a crossfooter "A" plus total operation in which the amount exceeds \$.99.

Early in the machine cycle when registers 2, 3 or 4 are selected, slide F is shifted to the right by the register selection rack to move stud E out of the path of rack O. Latch M is rocked out of

the path of arm H by stud N when crossfooter "A" symbol bar J is raised to total position. If the amount being totaled exceeds \$.99, latch K, which is rocked by the type bar in the \$1.00 column and by the overlapping tails of the latches in the columns to the left, rocks latch L out of the path of the projection on bail I.

As the operation continues, adding rack actuating shaft G moves forward permitting spring P to pull rack O forward to position pass-by pawl Q forward of the roll on bail R.

When actuating shaft G moves rearward, pawl Q rocks bail R, and, through stud D, releases latch plate C to allow carriage opening bell-crank A and lever B to restore to normal, thus disabling the carriage opening mechanism.

During a balance operation in which the amount does not exceed \$.99, during a listing operation, or during a minus balance operation, latches L and/or M block bail I, thus limiting the forward travel of rack O to prevent pass-by pawl Q from rocking bail R.

Tests and Adjustments

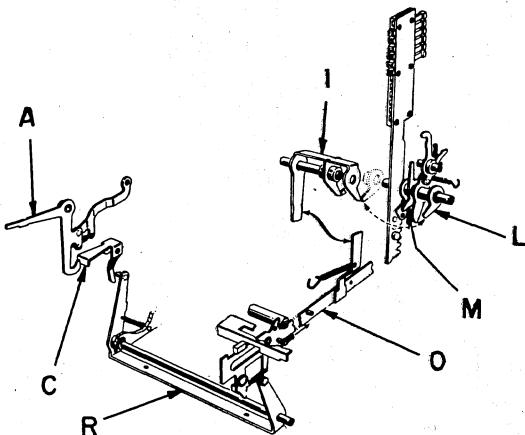


Fig. VII-71

C32-1 With the machine normal, projections on bail I should align with indexing fingers L and M.

TO ADJUST, shift bail I laterally as required.

REASON: To prevent bail I from going forward when indexing fingers are not indexed.

C32-2 NOTE: During crossfooter "A" plus total operations when the amount exceeds \$.99 there should be no less than .010" clearance of the projections on bail I over indexing fingers L and M.

C32-3 When rack O is restored during a machine cycle the stud in the arm of bail R should raise latch C above the hook of bellcrank A.

TO ADJUST, weave bail R as required.

REASON: To ensure normalizing bellcrank A, thereby disabling the carriage opening mechanism.

NOTE: During a machine operation the upper surface of latch C should not bind on bellcrank A.

ERROR KEY TO RELEASE REPEAT OF MACHINE OPERATION

This mechanism which releases the repeat of machine operation when the error key is depressed, is used in conjunction with the crossfooter "A" minus balance lock so that in the event the machine operation is halted with motor bar No. 1 depressed and repeat of machine operation (REPT or REPT-KB) was indexed at the previous carriage position depression of the error key will release the motor bar and the repeat of machine operation. This permits the operator to select the desired operation to complete the posting.

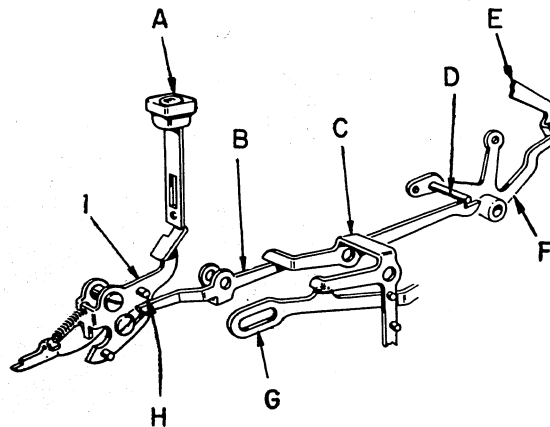


Fig. VII-72

When repeat of machine operation and keyboard has been indexed at the previous carriage position, a second depression of the error key is required to release the keyboard setup.

This mechanism is also used when the error key is depressible during repeat of machine operation, thus providing a means of stopping a continuous machine operation by depressing the error key.

The repeat of machine operation is released when depression of error key A rocks bellcrank C, through lever I, stud H and lever B. Rocking of bellcrank C permits the projection of repeat slide G to reset under the formed ear of bellcrank C and also lowers the rearward arm of bellcrank C out of the path of stud D, where it is retained by slide G thereby allowing the drive trip mechanism to reset.

Tests and Adjustments

K10-1 With a repeat of machine operation indexed and machine cycled to latch stud D on the cutout of bellcrank C, there should be no more than .003" to .005" clearance between the arm of lever B and the rear stud of bail I. **TO ADJUST**, tip the left ear of bellcrank C at its point of contact with lever B.
REASON: To allow stud D to be latched by bellcrank C.

K10-2 With repeat of machine indexed and machine cycle completed to latch stud D on bellcrank C, slowly depress the error key, there should be no less than .010" clearance between the right front arm of bellcrank C and the front projection of slide G at peak of throw. **TO ADJUST**, weave the right front arm of bellcrank C as required.
REASON: To allow slide G to restore to normal and block bellcrank C.

REPEAT OF MOTOR BAR NO. 4 AND DISABLING OF LANE 1 TABULATION (RB4DL1), CARRIAGE CONTROLLED, LANE 23

This mechanism, which is indexed from a No. 1 control pin in lane 23, is used in conjunction with the Automatic Fee Indexing Mechanism to enforce the automatic posting of a fee for each check posted. The mechanism when active in the check position, permits carriage controlled repeat of motor bar No. 4 (MBR), but disables skip tabulation in lane 1 from motor bars Nos. 1 and 4. Thus, depression of either motor bar No. 1 or 4 in the check position will result in tabulation to the next stop position to automatically post the fee. The carriage will then tabulate from the fee position to the deposit or balance position in lanes 1 or 3 to complete the posting.

Repeat of Motor Bar No. 4

To obtain a carriage controlled repeat of motor bar No. 4 through the auxiliary motor bar repeat mechanism (MBR), the carriage controls must be active with a No. 1 control pin in lane 23.

When motor bar No. 4 is depressed and the machine operates, rotation of sensing cam J raises sensing lever G and tappet H to limit on No. 1 control pin I and rock bellcrank F. Rocking of bellcrank F rocks arm L, through link E and spring K, to move latch M clear of the formed ear of bail D, thus permitting the bail to raise arm N, through stud C, when the bail is rocked from carriage controls in lane 18 (MBR).

With arm N in its raised position, stud B idles across the upper step of arm A when arm N is moved forward by shaft assembly P, thus preventing the stud in arm O from moving locking slide Q forward to release the depressed motor bar.

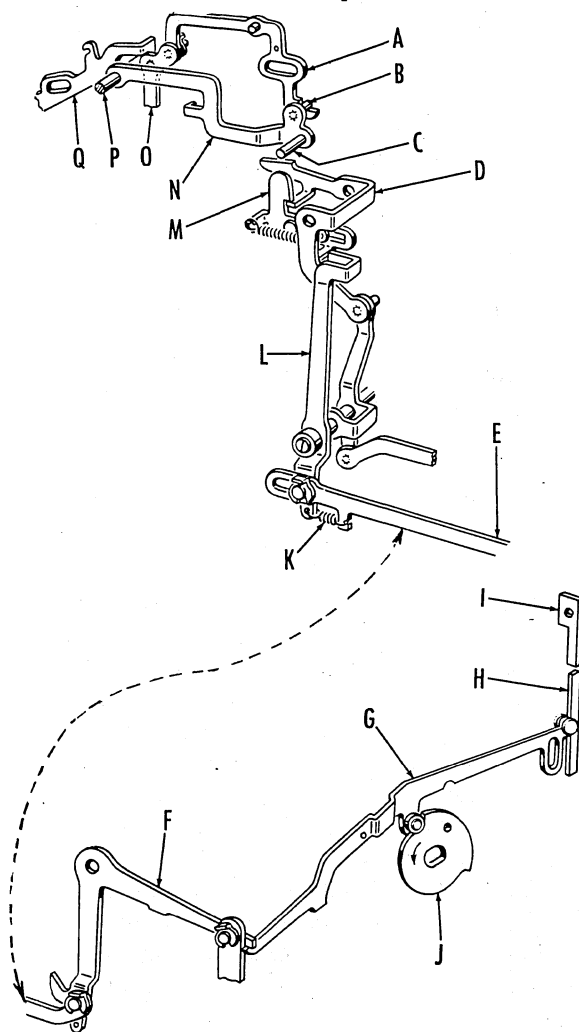


Fig. VII-73

When the machine is operated with no control pin in lane 23, latch M, which is attached to the motor bar No. 1 linkage, prevents repeat of motor bar No. 4 by blocking bail D. Repeat of motor bar No. 1 is permitted when latch M is moved forward by the motor bar No. 1 linkage to clear the formed ear of bail D.

Disabling of Lane 1 Tabulation

Lane 1 tabulation from motor bars Nos. 1 and 4 is disabled when the RB4DL1 mechanism is indexed from a No. 1 control pin in lane 23. Although not used on current "fee posting" applications, lane 2 return from motor bar No. 1 is also disabled when this mechanism is active.

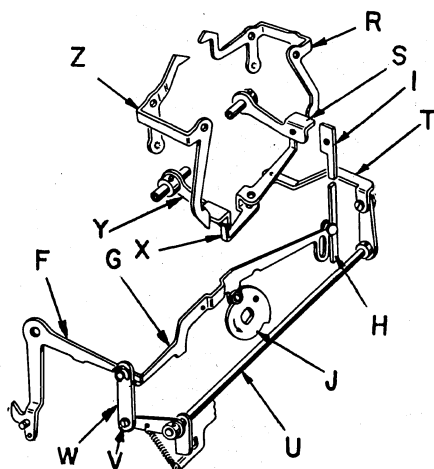


Fig. VII-74

Early in the machine cycle, rotation of sensing cam J raises sensing lever G and tappet H to limit on No. 1 control pin I and rock bellcrank F. Rocking of the bellcrank raises link W to rock shaft assembly U and link T, thus swinging the formed ears of arm X into the paths of tabulation and return latches Z and R in lanes 1 and 2, respectively. With the formed ears of arm X positioned in the paths of the tabulation and return latches, paddles Y and S are prevented from latching on the steps of the latches, thus disabling lane 1 tabulation and lane 2 return. The carriage will then tabulate to the next stop position.

Tests and Adjustments

NOTE: Basic adjustments for Sensimatic Control Unit, Sensing Camshaft and Sensing Bell-

cranks location must be made prior to the following adjustments.

C17-1 With a No. 5 pin active in lane 20 and the machine operated manually, the formed ears of bellcrank X should align centrally with latches R and Z. For style F206 basic, same as above using lane 23 with No. 1 control pin. TO ADJUST, turn eccentric in rear end of link T as required.

REASON: To prevent latches R and Z from latching under paddles.

NOTE: To prevent interference, the formed ears of bellcrank X should clear lane 1 and 5 tab and return when machine is normal.

C17-2 With a No. 5 control pin active in lane 20 and a No. 5 control pin active in lane 18 (MBR), No. 4 motor bar depressed, operate the machine manually, latch on slide M should clear the forward ear of bail D and should be held forward during machine operation by the latch plate.

TO ADJUST, bend extreme rearward end of bellcrank F for .003" to .005" clearance between sensing lever and bellcrank.

REASON: To ensure repeat of motor bar No. 4.

DUAL NET PROOF MECHANISM, ACCUMULATORS "B" AND/OR "C"

The dual net proof mechanism provides a means of transferring minus totals and subtotals of crossfooter "A" into accumulators "B" and/or "C" as subtract amounts.

Plus totals and subtotals of crossfooter "A" are transferred to accumulators "B" and/or "C" as plus amounts in the normal manner; and minus totals and subtotals of crossfooter "A" are transferred to accumulators "B" and/or "C" as subtract amounts from a No. 5 control pin in lane 16, thus providing net accumulation of the crossfooter "A" totals and subtotals.

The net proof totals may be accumulated in only one accumulator, either "B" or "C", through a No. 9A control pin (non-add) in the subtract lane for the accumulator which is to be non-added.

With a No. 6 control pin active in lane 16, plus totals and subtotals of crossfooter "A" are transferred to accumulators "B" and/or "C" as plus amounts and minus totals and subtotals of crossfooter "A" are non-added, thus providing a plus net proof.

Indexing the Dual Net Proof Mechanism

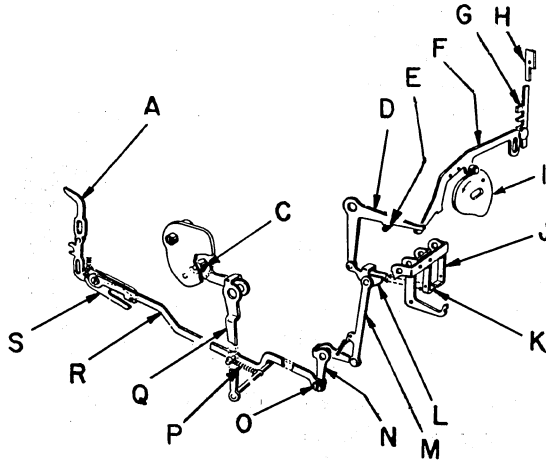


Fig. VII-75

Initial indexing of the dual net proof mechanism occurs during a machine operation in which the nature of the crossfooter "A" total is changed to minus - lowering slide A and raising latch S out of the path of the formed ear on slide R.

Early in the machine cycle of each subsequent machine operation, rotation of the main camshaft rocks lever Q, through cam B and roller C, permitting spring P to move slide R rearward rocking bellcrank N to move double pawl L upward in line with the formed ears of bails J and K.

Complete indexing of the dual net proof mechanism is accomplished when rotation of sensing cam I raises sensing lever F and tappet G to limit on No. 5 control pin H and rock bellcrank D. Rocking of the bellcrank moves double pawl I rearward to rock bails J and K, thus indexing sub-

tract operations in accumulators "B" and/or "C".

If a No. 7 control pin is used in lane 16, bails J and K will be rocked only far enough to index a non-add operation in accumulators "B" and/or "C".

Transferring Crossfooter "A" Minus Totals and Subtotals to Accumulator "B"

Crossfooter "A" minus totals and subtotals are transferred to accumulator "B" as subtract amounts when bail K moves link AA rearward, through stud Y and arm Z, to lower the upper arm of the accumulator "B" meshing hook into engagement with the square stud of the subtract/total control slide, thus indexing a subtract operation in accumulator "B".

If the crossfooter "A" totals are not to be accumulated in accumulator "B", a non-add operation is indexed in accumulator "B" through a No. 9A control pin in lane 11. Bellcrank X is rocked, moving link AA rearward, through arm T, thus positioning the accumulator "B" meshing hook into non-add position. Rocking of bellcrank X also raises link U to raise the hooked portion of arm Z out of engagement with stud Y, thus preventing bail K from indexing the accumulator "B" subtract linkage when the bail is rocked by the net proof bellcrank.

Transferring Crossfooter "A" Minus Totals and Subtotals to Accumulator "C"

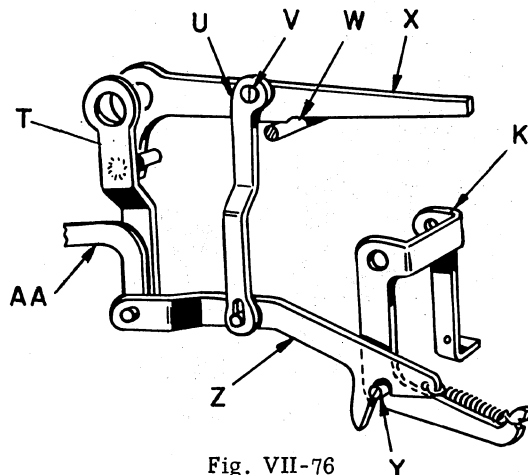


Fig. VII-76

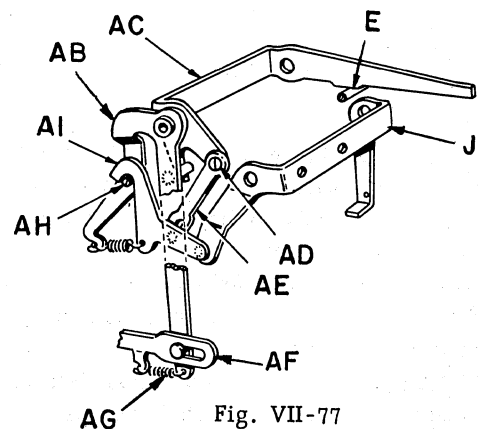


Fig. VII-77

Crossfooter "A" minus totals and subtotals are transferred to accumulator "C" as subtract amounts when bail J moves link AF rearward, through arm AI, stud AH, arm AB and spring AG, to lower the upper arm of the accumulator "C" meshing hook into engagement with the square stud of the subtract/total control slide, thus indexing a subtract operation in accumulator "C".

If the crossfooter "A" totals are not to be accumulated in accumulator "C", a non-add operation is indexed in accumulator "C" through a No. 9A control pin in lane 17. Bellcrank AC is rocked, moving link AF rearward, through arm AB and spring AG, thus positioning the accumulator "C" meshing hook into non-add position. Rocking of bellcrank AC also raises link AE to raise the hooked portion of arm AI out of engagement with stud AH, thus preventing bail J from indexing the accumulator "C" subtract linkage when the bail is rocked by the net proof bellcrank.

Tests and Adjustments

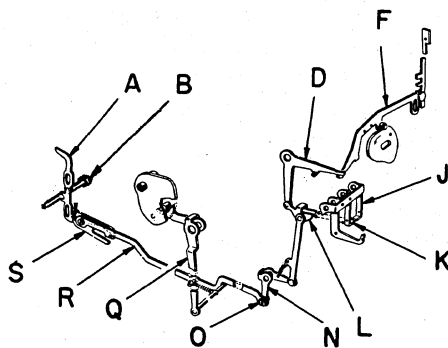


Fig. VII-78

A2-1 There should be equal play of stud B in both plus and minus positions. This test should be made when manually holding slide A in both plus and minus positions.

TO ADJUST, weave bail for stud B.

REASON: To maintain bail B in its correct relation with its component parts.

A2-2 With slide A in its upward (plus) position and the hooked portion of latch S over the formed ear of link R, manually raise bellcrank N and move pawl L rearward. There should be

.005" to .010" clearance of pawl L under the formed ears of bails J and K.

TO ADJUST, turn eccentric screw O.

REASON: To prevent indexing the dual net proof mechanism when the nature of the cross-footer "A" total is plus and to ensure immediate indexing of the dual net proof mechanism when the nature of the crossfooter "A" total is minus.

A2-3 With slide A in its lower (minus) position, the hook portion of latch S should have .005" to .015" clearance over the formed ear of link R. TO ADJUST, weave link R up or down as required.

REASON: To allow link R to move rearward during a credit balance total.

A2-4 With the machine normal, there should be .003" to .005" clearance between bellcrank D and sensing lever F (lane 16).

TO ADJUST, bend the extreme rear end of bellcrank D.

REASON: To ensure correct relationship between pawl L and bails J and K.

A2-5 With a No. 5 pin active in lane 16 and crossfooter "A" in minus balance position, link R should start to move rearward at approximately 10° to 12° in the machine cycle.

TO ADJUST, weave arm Q to tilt its stud forward or rearward.

REASON: To allow sufficient time for slide A to locate in credit position following a cross-footer run through carry operation.

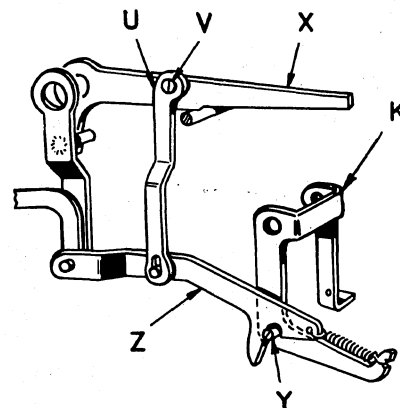


Fig. VII-79

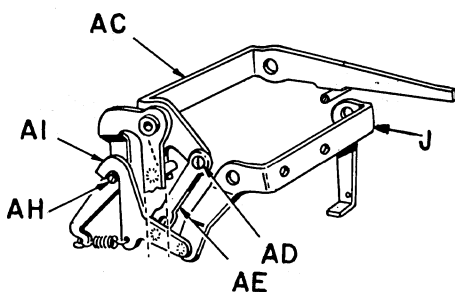


Fig. VII-80

A2-6 With the machine normal and slide A in lower (minus) position, there should be .020" clearance between the nose of pawl L and the formed ears of bails J and K when bellcrank N is rocked upward.

NOTE: The high point of eccentric screws AD and V in links AE and U should be turned to their lowest point before making the following adjustment.

TO ADJUST,

A. Turn eccentric AH for bail J.

B. Turn eccentric Y for bail K.

REASON: To establish the normal position of bails J and K.

A2-7 With a No. 5 pin active in lane 16 and crossfooter "A" in minus balance position, manually cycle the machine. Accumulator "B" and "C" meshing hooks should have at least 3/4 hold on the square studs in the subtract/total slide.

TO ADJUST, recheck adjustment A2-6.

REASON: To ensure lowering the "B" and "C" subtract meshing hooks into subtract position prior to rearward movement of the subtract/total control slide.

NOTE: With a No. 7 (seven) pin active in lane 16, the meshing hooks should be lowered to non-add position.

A2-8 With a No. 9A pin (non-add) in lane 17 and the dual net proof mechanism active, the hooked portion of arm AI should seat within .005" to .010" of eccentric screw AH.

With the machine manually cycled bellcrank AC should immediately disengage arm AI from eccentric screw AH.

TO ADJUST, turn eccentric screw AD in link AE.

REASON: To prevent a subtract operation in accumulator "C" when crossfooter "A" is minus and the net proof mechanism is active.

A2-9 With a No. 9A pin (non-add) in lane 11 and the dual net proof mechanism active, the hooked portion of arm Z should seat within .005" to .010" of eccentric screw Y.

With the machine manually cycled, bellcrank X should immediately disengage arm Z from screw stud Y.

TO ADJUST, turn eccentric screw V in link U.

REASON: To prevent a subtract operation in accumulator "B" when crossfooter "A" is minus and the net proof mechanism is active.

NON-ADD AND NON-CLEAR MECHANISM

The non-add non-clear mechanism is used to provide a means of non-adding amounts indexed on the keyboard or to prevent clearing and transferring of accumulated amounts-in a single column or one group of consecutive columns. This permits indexing amounts in two different groups of columns on the keyboard, holding the keys depressed through repeat operations, and allowing only one group of columns to add on certain repeat operations. Also, one side of a register may be permitted to retain a number, repeated through subtotaling and totaling operations, while the other side is cleared.

The mechanism is activated by the first three printing control positions of the Nine Position Printing Control Mechanism. When set to operate from printing control position No. 1, it will be activated only from a No. 1 control pin in lane 22; when set to operate from printing control position No. 2, it will be activated from a No. 1 or No. 2 control pin in lane 22; and when set to operate from printing control position No. 3, it will be activated from a No. 1, No. 2, or No. 3 control pin in lane 22.

Early in the machine cycle, when bell crank A is rocked to index the first, second, or third printing control position, the lower arm of the bell crank moves stud I rearward through spring G and lever F. Stud I contacts and rocks bail J

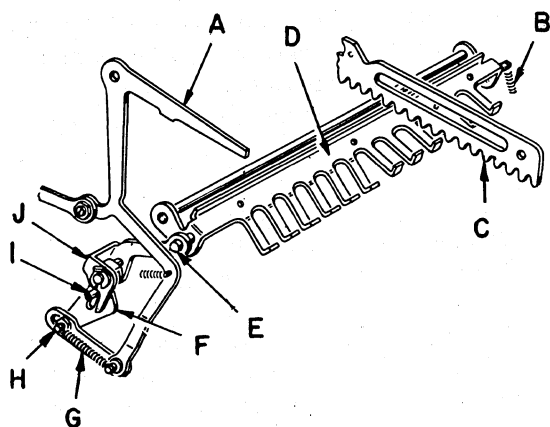


Fig. VII-81

which, through stud E, swings bail D upward, meshing the active teeth of the bail with adding racks C to block the adding racks in the controlled columns from moving forward. Thus, amounts indexed on the keyboard are non-added, or accumulated amounts are prevented from clearing and transferring.

The mechanism is restored to normal when bell crank A is lowered. Lowering of the bell crank moves stud I forward, through link H and lever F, permitting bail D to move downward out of mesh with the adding racks.

A yielding connection between bell crank A and lever F permits setting the mechanism to operate from more than one printing control position; e. g., when set to operate from printing control position No. 3, spring G will yield when the mechanism is activated by a No. 1 or No. 2 control pin in lane 22.

Spring B holds bail D in its inactive position to prevent the bail from bouncing upward if bail J is contacted by stud I when the next higher printing control position is selected; e. g., when the mechanism is set to operate from printing control position No. 3, stud I will just contact bail J when printing control position No. 4 is selected.

Tests and Adjustments

A26-1 With non add non clear bail D in its normal position, there should be not less than .020" clearance between the active teeth of the non add non clear bail and the adding racks. **TO ADJUST**, bend the active teeth of bail D up or down.

REASON: To prevent interference of the active teeth with the adding racks when bail D is in normal position.

A26-2 With the machine normal, manually raise the active teeth of bail D into full mesh with the adding racks. The inactive teeth of bail D should have approximately .050" clearance under the adding racks.

TO ADJUST, bend the inactive teeth of bail D up or down.

REASON: To prevent interference of the inactive teeth with the adding racks when the active teeth are in mesh with the adding racks.

A26-3 With the specified control pin No. 1, 2 or 3 active in lane 22, cycle the machine until bellcrank A receives its maximum throw. Stud I should rock bail J to raise the active teeth of bail D into full mesh with the adding racks.

TO ADJUST, locate stud I in the slot of lever F.

REASON: To ensure proper indexing of bail D from a No. 1, 2 or 3 pin.

NOTE: Stud I should just contact but not move bail J when a next higher numbered pin is active in place of the specified pin.

FORM SPACE AND NON-SPACE MECHANISM, DUAL SELECTIVE, WITH OR WITHOUT SPLIT AND NORMAL PLATEN

The form space and non-space mechanism provides different spacing results from either end of a solid or split platen. A space pawl and ratchet, variable line spacer, and space adjustment lever are used at both ends of the platen. The mechanism controls the space pawls to space or non-space when indexed from a carriage skid control. The spacing operation is indexed in the normal manner from a No. 5 control pin in lane 13 (SPACE) or from motor bar No. 1 or No. 3.

Dual Selective Form Spacing

A solid platen is used with the Dual Selective Form Spacing Mechanism to provide different spacing results from either end of the platen. With the space and non-space mechanism normal, the platen is spaced from the controls on the left; when the mechanism is indexed from a skid, the platen is spaced from the controls on the right.

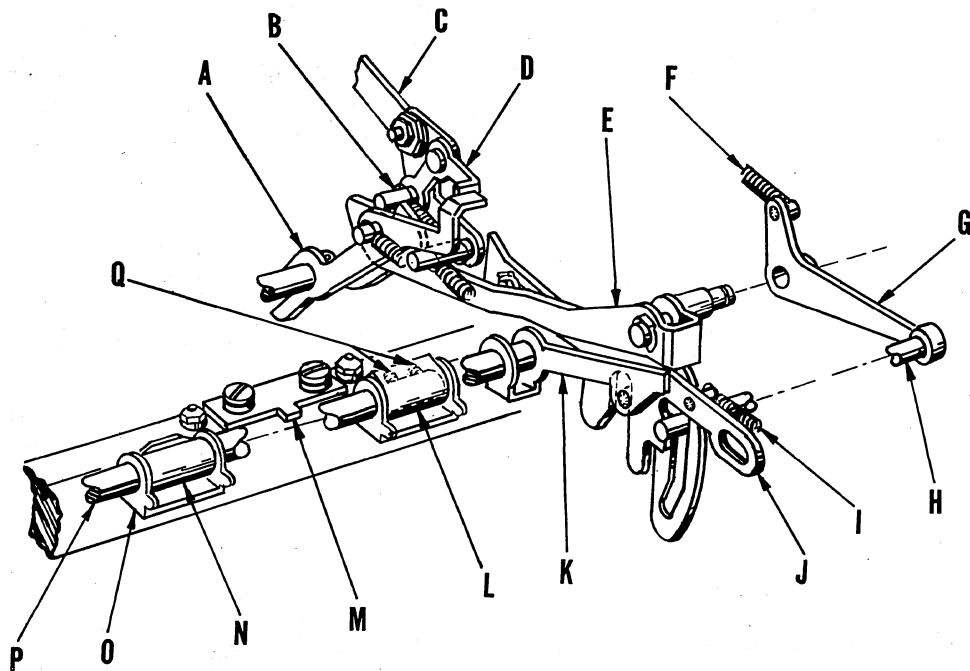


Fig. VII-82

Split and Normal Platen

When a split platen is used, either side of the platen may be spaced or non-spaced independently of the other side, thus providing independent vertical spacing of two forms. With a split platen the space or non-space mechanism controls are used at either the left or right or both ends of the platen.

The split platen may be normalized by depressing the coupling plunger in one end of the platen for Dual Selective operation or for forms of a different width on another schedule, as long as a column of print does not align with the split.

The following variations in platen spacing may be obtained by using space controls at either or both ends of the split platen.

Style 1

- (Normal) Space left; non-space right.
- (Indexed) Space both sides.

Style 2

- (Normal) Space both sides.
- (Indexed) Space right; non-space left.

Style 3

- (Normal) Space left; non-space right.
- (Indexed) Space right; non-space left.

During a machine operation in which a number 5 pin is active in lane 13, or in which motor bar No. 1 or No. 3 is depressed, space arm A rocks forward. The ear on arm A contacts toggle D and drives the space pawl and ratchet through link C. When the forward end of control arm E is in its raised position it contacts the stud of toggle D and lowers the ear of the toggle out of the path of arm A.

During carriage tabulation or return, as indexing skid L passes over the projection of plate M, arm K lowers arm G through stud H. The camming action of stud H, as it moves through the cam slot in control arm E, raises the forward end of the arm to index non-space. As stud H is driven downward, spring I moves latch slide J rearward to hold the assembly in indexed position.

Normalizing skid N passes under the projection of plate M, turns shaft P and raises arm K. The stud in arm K cams latch slide J forward, releases

stud H which moves upward through the tension of spring F and cams the forward end of control arm E downward. Spring B then swings toggle D to its normal position.

The camming slot of a control arm similar to E, but on the right side of the carriage is designed to reverse the action described above; that is, the space is enabled with the shaft assembly and controls in their indexed position and disabled with the controls in their normal position.

Shaft braces O are placed over each skid as they are assembled on shaft P. The braces are supported by the rear carriage rail, the upper surface of the control unit, and the rear form guide channel bail to prevent the control shaft from bowing as the skids pass over or under the projection of plate M.

Tests and Adjustments

C12-25 With the control panel installed in the carriage and the high portion of the indexing skid L positioned over the projection of limit plate M, there should be .015" to .025" latching lead between the studs H and latches J.

TO ADJUST, loosen the Bristol screws in skid L and position as required.

REASON: To permit independent vertical spacing of two forms.

C12-26 With the control panel installed in the carriage and the high portion of indexing skid N positioned under the projection of latch plate M, the studs H should be released from latches J without binding the studs of arms K in the top of the camming slots in latches J.

TO ADJUST, loosen the Bristol screws in skid N and position as required.

REASON: To permit independent vertical spacing of two forms.

PERMANENT SPLIT - CROSSFOOTERS AND REGISTERS

Split accumulators are used to accumulate two amounts of either a plus or minus nature in one accumulator. The left side of the accumulator is normally used to accumulate quantity or a count of items, while the right side accumulates the amount.

Crossfooters

Note: In machines containing an Automatic Count mechanism, the columns to the left of the split will operate as described in that Subject.

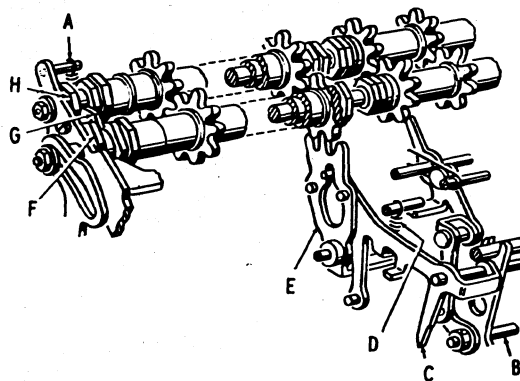


Fig. VII-83

Crossfooters containing a permanent split will produce true minus totals only from the pinions in the columns to the right of the split.

Automatic One shaft assembly B is positioned to operate from the leftmost pinion in the columns to the right of the split.

The pinion assemblies in the columns to the left of the split do not receive a cross-sliding action, but are held stationary against the pinion assembly side frame by a screw and flanged nut G. The flange of the nut fits into a groove of hexagon nuts F and H on the pinion shaft assemblies.

Only the forward set of pinions to the left of the split is meshed with the adding racks at any time. The rear set of pinions is used for alignment only. The aligning bail is rocked into the tooth spaces of the pinions by spring A when they are moved from the carry racks to the adding racks and vice versa, thus maintaining the correct position of the pinions.

To prevent a carry from the pinions on the right of the split to the pinion on the left of the split, the carry index bail and carry driver arm latch are omitted between the split columns. Spring D holds driver arm C in its normal position, thus holding carry rack E stationary.

Registers

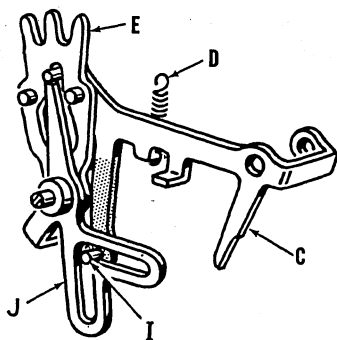


Fig. VII-84

To provide a permanent split in a register section, carry driver arm C is disabled by spring D holding the driver arm in its normal upper position, thus holding carry rack E in the first column to the left of the split in a stationary position and preventing a carry. The lower portion of the rearward arm of driver arm C is bent to allow stud I to clear carry index bail J. This prevents the carry index bail from interfering with free movement of the pinion to the right of the split when the long tooth of the pinion passes the carry pawl.

REPEAT OF REGISTER SELECTION KEYS IN COLUMN "O" - CARRIAGE CONTROLLED

Register selection keys in column "O" are repeated in conjunction with amount keys during a carriage controlled repeat of keyboard operation (REPT-KB), thus providing a means of automatically selecting the indexed register in a subsequent carriage position. The mechanism may be used in machines constructed with either 9 or 12 register selection keys in column "O".

During a machine operation in which carriage controlled repeat of keyboard is indexed, repeat slide A is moved to the left blocking forward movement of locking slide B—thereby preventing release of the depressed register selection key. Spring C and slide D provide a yielding connection to permit restoring shaft assembly E to move forward during a repeat operation when locking slide B is blocked by slide A.

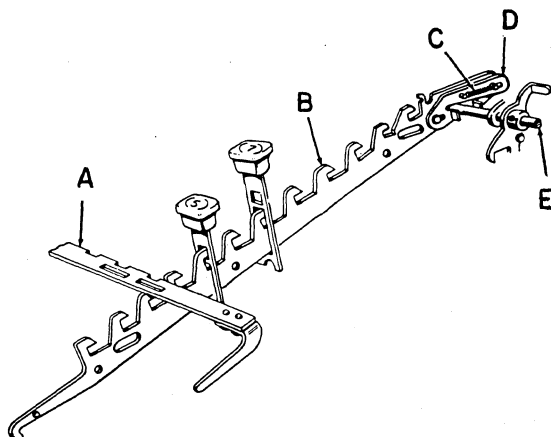


Fig. VII-85

Repeat slide A is restored to normal during the subsequent machine operation to permit restoring shaft E to move locking slide B forward without expanding the yielding connection, thus restoring the depressed keystem.

REPEAT OF KEYBOARD SETUP OR REPEAT OF KEYBOARD SETUP AND MACHINE OPERATION, CARRIAGE CONTROLLED

This mechanism permits indexing Repeat of Keyboard Setup from a No. 7 control pin in lane 21; or Repeat of Keyboard Setup and Machine Operation from a No. 5 control pin in lane 21. This permits indexing an amount on the keyboard in one carriage position and holding the amount indexed while selecting an alternate motor bar and/or register selection key in a subsequent carriage position. When this feature is used with the feature Repeat of Register Selection Keys in column "O", both the amount keys and register selection keys are repeated.

With a No. 7 control pin active in lane 21, repeat slide F is moved rearward rocking arm H, through stud G, to move slide B forward positioning its forward projection under bellcrank A, thus indexing Repeat of Keyboard Setup. The repeat slide is retained in its rearward position by the formed ear of bellcrank C.

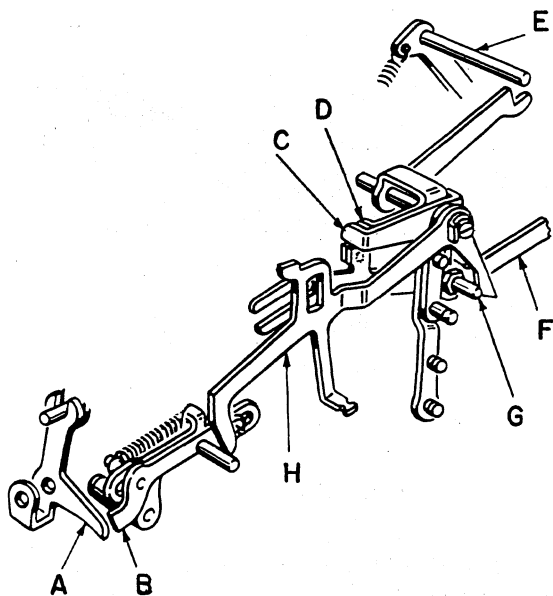


Fig. VII-86

With a No. 5 control pin active in lane 21, the repeat slide is moved farther rearward to move its forward projection clear of the formed ear of bellcrank D. This permits the arm of the bellcrank to swing upward into the path of stud E to prevent resetting of the drive trip mechanism. Arm H is also rocked, thus Repeat of Keyboard Setup and Repeat of Machine Operation are indexed.

The mechanism is restored to normal during a subsequent machine operation when bellcranks C and D are rocked to permit the repeat slide to move forward positioning its forward projection under the formed ears of the bellcranks.

REPEAT OF KEYBOARD COLUMNS (SPECIFY) LANE 21

This feature permits only certain keyboard columns to repeat from a No. 7 pin in lane 21 and a full keyboard repeat and repeat of machine operation from a No. 5 pin. This partial repeat of keyboard allows the operator to re-index certain keyboard columns in subsequent carriage positions and have other columns, which have been previously indexed, repeat and remain locked against any change.

The parts of the basic feature, "Repeat of keyboard and Repeat of machine operation," have been redesigned to shift the keyboard restoring slide L to one of two positions. A No. 7 or a No. 5 pin in lane 21 determines the position slide L is indexed. The projections on slide L are trimmed, in the specified columns, so they will clear the locking slides of the columns to be repeated when the slide is partially shifted. The remaining projections will clear the other locking slides when slide L is fully shifted with a No. 5 pin. Pawl I contains two steps to provide a means of partially and fully shifting slide L. The lower step is indexed by a No. 7 pin and partially shifts slide L, the upper step is indexed by a No. 5 pin and fully shifts slide L. Bail R, which shifts the keyboard locking strip, also has two steps for lever H to latch restoring slide L and locking strip Q in their two positions.

In a carriage position with a No. 7 pin in lane 21, repeat slide U is moved rearward through the sensing action of tappet A, lever B, and bellcrank D. The rearward movement of slide U positions the lower step of pawl I under bell crank K through lever S and stud G. A repeat of machine operation is not indexed from a No. 7 pin since repeat slide U does not receive sufficient rearward movement for its projection to clear the formed ear on the repeat bail T. During the machine cycle the rearward movement of the add control slide J rocks pawl I. The rocking of pawl I partially shifts restoring slide L through bellcrank K; lever H is then allowed to latch the first step on bail R. With bail R latched, it holds the restoring slide and locking strip Q in the partially indexed position. As the machine cycle continues and restoring slide L is rocked forward, the trimmed projections will clear their respective columns locking slides. Depression of other keys in the repeated columns will be prevented by the cutouts in the locking strip Q being shifted out of the path of the locking slide P. The cutouts on the locking strip in the columns which are not repeated, will still align with the locking slide O. Slide L and locking strip Q remain latched until the beginning of the next machine operation, when the action of bellcrank E through link F unlatches lever H. With lever H unlatched, the restoring slide and keyboard lock strip are restored to normal through tension of spring M. The rearmost portion of link F has been redesigned

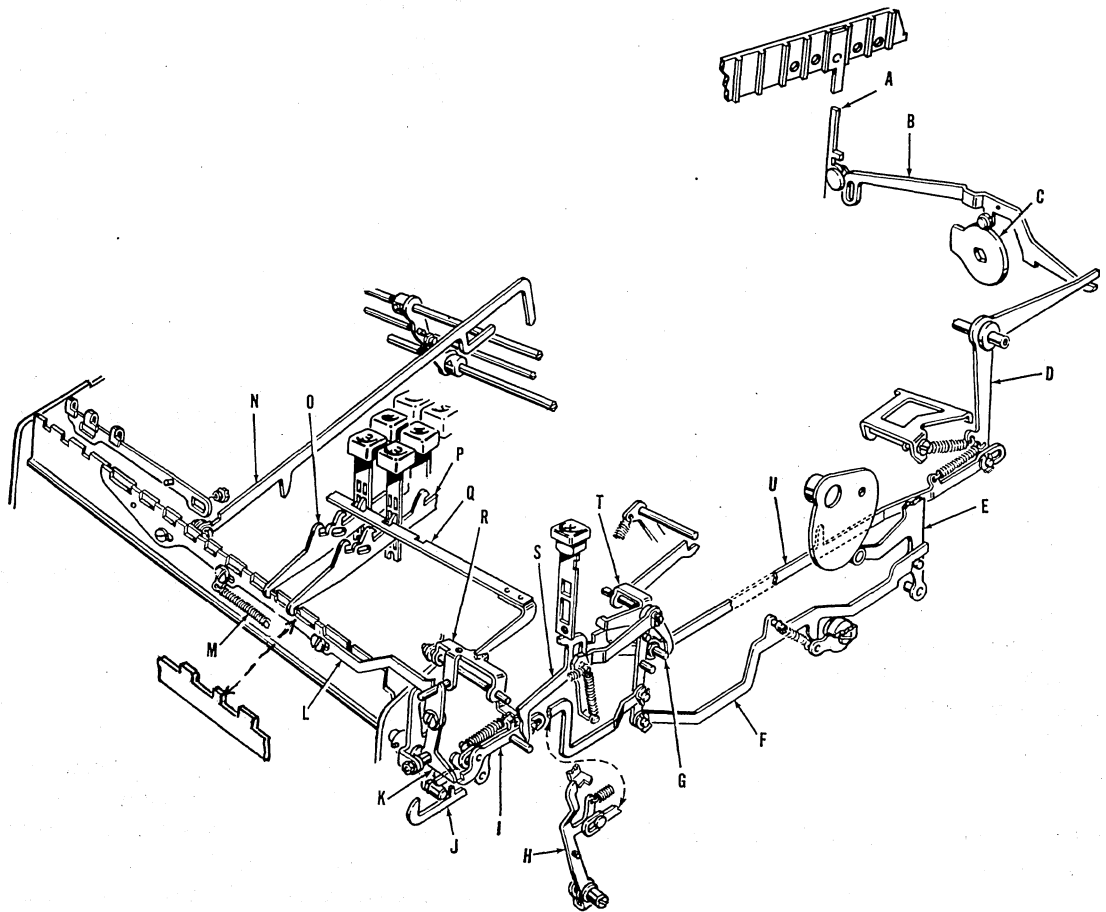


Fig. VII-87

to delay the unlatching of lever H until booster slide N has rocked the restoring slide L rearward to clear the hooked portion of the locking slides O and P. This is to prevent lever H from "hanging up" on the first step of bail R when the lever is unlatched from a full keyboard repeat.

When the machine is operated with a No. 5 pin in lane 21, the upper step of pawl I is positioned under bellcrank K. The No. 5 pin gives sufficient rearward movement to the repeat slide

U to index repeat of machine operation. As the machine cycle progresses the add control slide J raises pawl I. With pawl I raised the restoring slide is shifted and latched for a full keyboard repeat.

Since pawl I requires two definite amounts of forward movement, indexed through repeat slide U, the latching step has been removed from bellcrank D and the high portion of cam C has been extended to hold the repeat slide indexed until bail R has been latched by lever H.

REGISTER SELECTION, C.C., TO PREVENT SELECTION (AND/OR) INDICATION OF A HIGHER NUMBERED REGISTER FROM KEYBOARD COLUMN "O" (SERIES F300-F500)

The mechanism described in this subject provides a flexibility of register selection and indication desired for certain Series F300 and F500 machine applications.

This subject is divided into two styles; Style 1 construction and Style 2 modification. Style 1 construction is further divided into two phases; "Keyboard Interlock to Disable Carriage Controlled Index—Omitted" and "Register Designation to Print Only from Column "0". The use of this mechanism, either Style 1 or Style 2, prevents the selection of a higher numbered register from keyboard control, when the selection is indexed simultaneously from a control pin in lane 25 and a key in column "0". This is because the progressive numerical order of register selection from carriage controlled index and from keyboard controlled index is the same.

Style 1

Keyboard Interlock To Disable Carriage Controlled Index—Omitted

In Style 1 construction, used only in machines with nine register selection keys in column "0", the Keyboard Interlock to Disable Carriage Controlled Index of Register Selection is omitted. This permits the selection of the lower numbered register, indexed from carriage or keyboard control.

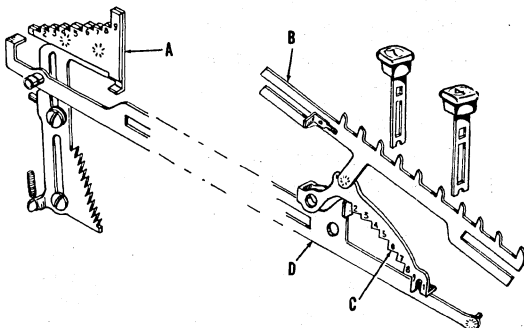


Fig. VII-88

The register index rack D, driven forward from the main camshaft, selects the lower numbered register according to the limit provided by register index step plate A or keyboard index rack C. (Example 1) In a carriage position with a No. 5 control pin active in lane 25 and a No. 4 keystem in column "0" depressed, rack D will select register No. 4. (Example 2) In a carriage position with a No. 5 control pin active in lane 25 and a No. 7 keystem in column "0" depressed, rack D will select register No. 5. On a machine operation with no control pin active in lane 25 and no key depressed in keyboard column "0", register No. 9 will be selected from the register index rack limiting on the foremost step of rack C and the No. 9 step of step plate A - as in the basic construction of nine register selection.

Register Designation To Print Only From Column "0"

The designation index rack which is positioned from the register selection rack is omitted and in its place is an inverted designation index rack which is positioned from the keyboard index rack in column "0". This inverted index rack provides limits to the forward travel of the rack in position 11A or 11B, which, through the cluster gear unit, positions the symbol type bar in printing position S-2.

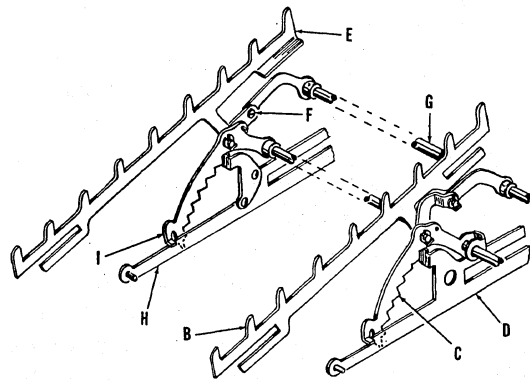


Fig. VII-89

The depressed keystem in column "0" provides a limit for index strip B and index rack C to select the desired register, when it is a lower numbered register than that indexed from carriage control. Index strip B and index rack C

through shaft assembly G position the identical step of designation index rack I in the path of the formed ear of rack H. The forward movement of rack H, until its formed ear limits on the step of designation index rack I, raises the type bar in printing position S-2 to designate the selected register.

When the register indexed from keyboard column "0" is a higher numbered register than that indexed from carriage control, the register index rack D limits on index step plate A. Identification only, then, is indexed from the higher numbered key in column "0" and does not necessarily designate the register selected.

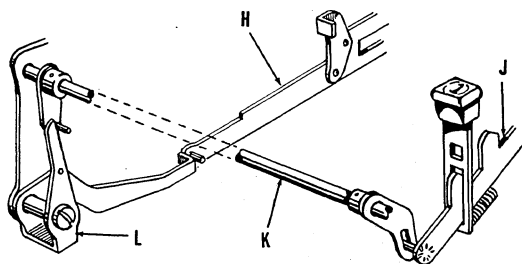


Fig. VII-90

Designation of the register selected from carriage control is prevented on any machine operation unless a key in column "0" is depressed. Limit bail L, positioned in the path of the stud in the forward end of rack H, prevents rack H moving forward.

When any key in column "0" is depressed, the depressed keystem cams, then holds slide J forward. The stud in the forward end of slide J rocks shaft assembly K and limit bail L. This moves the lower arm of bail L clear of the stud in rack H, permitting rack H to move forward.

Style 2

This modification of basic construction in any Series F300 or F500 machine disables the function of the "Keyboard Interlock to Disable Carriage Controlled Index." The carriage controlled index then, prevents the selection of a higher numbered register from keyboard index by providing an earlier limit for the register index rack. The designation of the register thus select-

ed is indexed from the register selection rack, except when designation keys 10-0, 11-0 and 12-0 are used. This modification is accomplished by a change in the spring connection of the "Keyboard Interlock to Disable Carriage Controlled Index."

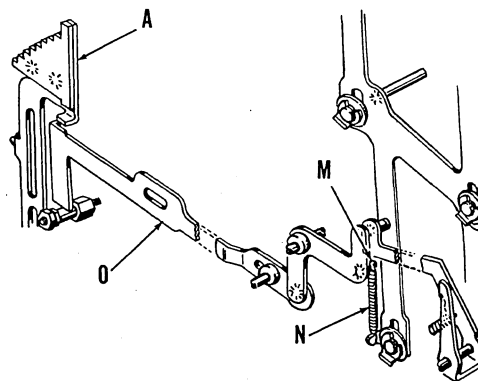


Fig. VII-91

Spring N, connected between stud M and the spring anchor of motor bar No. 2, holds interlock slide O in its rearward (normal) position. This permits register index step plate A to move downward and index a limit for the register index rack each machine operation. When registers are selected simultaneously from carriage control and keyboard control, the lower numbered register will be selected.

When key 10-0, 11-0 or 12-0 is indexed in a carriage position with a control pin active in lane 25, register No. 9 normally selected will be superseded by the register selected from carriage control but, the designation indexed from key 10-0, 11-0 or 12-0 will print. The designation indexed from these keys normally supersedes the designation from keys 1-0 through 9-0 and will, in this modification, supersede designation from any other index.

REGISTER SELECTION FROM KEYBOARD COLUMN "0" FOR F200 AND F400 MACHINES

This mechanism provides a means of selecting registers of the F200 and F400 series of machines from keyboard Column "0" and designating the selected register with symbols or characters in printing position S-2. The register selection

mechanism used in this construction is basically the Nine Register Selection mechanism used in the Series F300 and F500 machines, except that only four registers are used. Control pins No. 1, No. 2 and No. 3 in lane 25 of Carriage Control, index selection of registers No. 1, No. 2 and No. 3 respectively and, no control pin indexes selection of register No. 4. Keys 1, 2, 3 and 4 in Column "0" of keyboard control, index selection of registers No. 1, No. 2, No. 3 and No. 4 respectively. Keys 5-0 through 12-0 index selection of register No. 4 and index the appropriate symbol or character to identify the posting entry. Register No. 4, referred to in this text is the register No. 9 pinions of the Nine Register Unit.

Keyboard Selection of Registers

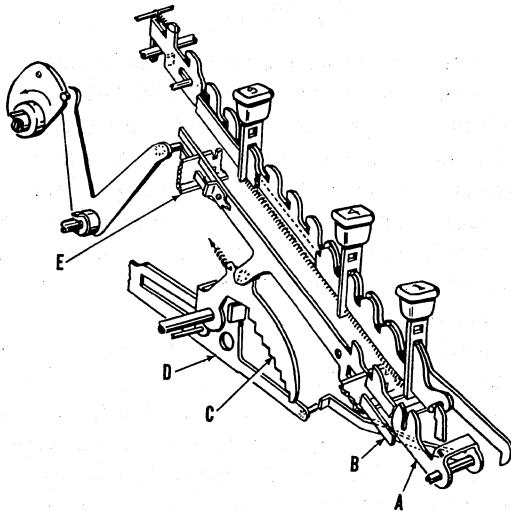


Fig. VII-92

Register No. 1 is selected from key 1-0. The depression of key 1-0 rocks bail A to position its lower arm into the path of the stud in the forward end of register index rack D. This prevents forward movement of rack D, resulting in register No. 1 remaining in active position. Index strip B in position "OL" (to the left of Column "0") moves all the way rearward as it does not have a projection for the 1-0 keystem.

Registers No. 2 and No. 3 are selected from keys 2-0 and 3-0 respectively. When index strip B is limited against the depressed keystem, keyboard index rack C thus positioned provides a limit for the formed ear of register index rack D, resulting in register No. 2 or No. 3 being selected.

Register No. 4 is selected from any of keys 4-0 through 12-0. As there are no projections on index strip B for any of these keystems, index strip B moves all the way rearward to limit its riveted projection on tie strip E. This permits register index rack D to move all the way forward until its formed ear limits on the foremost step of keyboard index rack C; thus selecting register No. 4.

Register Designation

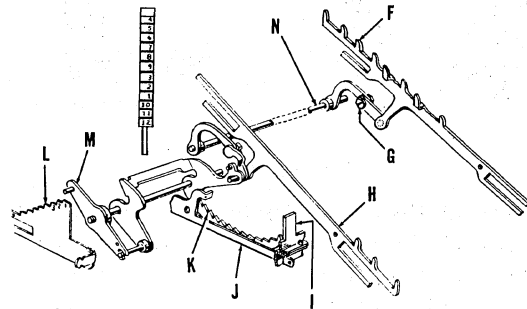


Fig. VII-93

Designation of the selected register in printing position S-2, is indexed either from the register selection rack L or from index strip F in Column "0". Registers No. 1, No. 2 and No. 3 are designated from steps 1, 2 and 3 of register selection rack L and register No. 4 is designated from the lowest or 9 step. The symbols or characters indexed from keys 5-0 through 12-0 enables identification of posting entries which accumulate in register No. 4. Any of these keystems, when depressed, provides a limit for index strip F in position "0". Index strip F then, through shaft assembly N, positions designation index rack K to properly limit rack J. This combined method of indexing designation from register selection rack L and keyboard index strip F results in the special type arrangement illustrated.

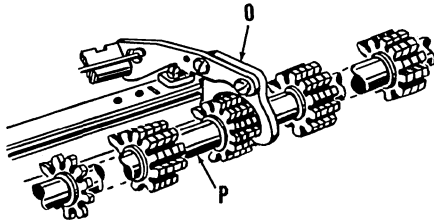


Fig. VII-94

The functioning of the nine register selection mechanism used in this construction requires a special arrangement of the pinions in the register unit. The pinions for registers No. 1, No. 2 and No. 3 are assembled in consecutive order and adjacent to the register No. 9 pinion for the column to the left. This results in the pinion arrangement indicated in Fig. 3. Additional pinions are assembled in the center section of pinion sleeve P to accommodate use of center brace O.

Test and Adjustments

Tests and Adjustments for the nine register selection mechanism in the accumulation section should be made on the above mechanism.

REGISTER SELECTION, CONTROLLED FROM SELECTOR LEVER

The selection of registers from a lever on the machine keyboard provides separate accumulation of amounts, such as deposits and withdrawals, for each of two tellers or regular and relief operators. Each teller or relief operator will have their own key which allows them to shift the lever only one way and select only certain registers.

Selector Lever

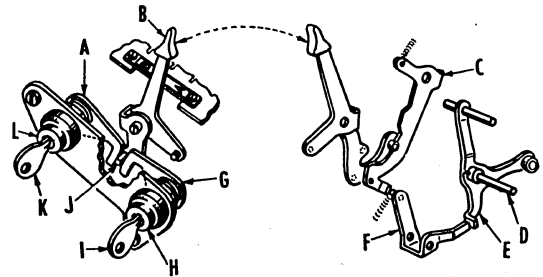


Fig. VII-95

With the selector lever B in its center position and the lock assemblies L and H in their locked positions, shifting of lever B is prevented through arms A and G blocking stud J. When lever B is in center position, machine operation is prevented through the arm of bail F blocking arm E and shaft assembly D to prevent the drive from tripping. When selector lever B is shifted to position "A" or "B", the arm of bail F is lowered out of the path of the formed ear of arm E, through arm C, thus permitting the drive to be tripped.

When key K is turned, and the selector lever shifted to position "A", register No. 1 is in active position and register No. 3 may be selected from carriage controls.

When key I is turned, and the selector lever shifted to position "B", register No. 2 is in active position and register No. 4 may be selected from the same carriage controls.

Selector lever B is held in position "A" or "B" through detent P and spring T, unless locked at position "A" or "B". Lever B is restored to center position from each carriage controlled "carriage open" operation when bellcrank M rocks lever N to move link O rearward to rock shaft assembly R. Rocking shaft assembly R lowers link V and detent P to allow spring S to restore lever B to center position.

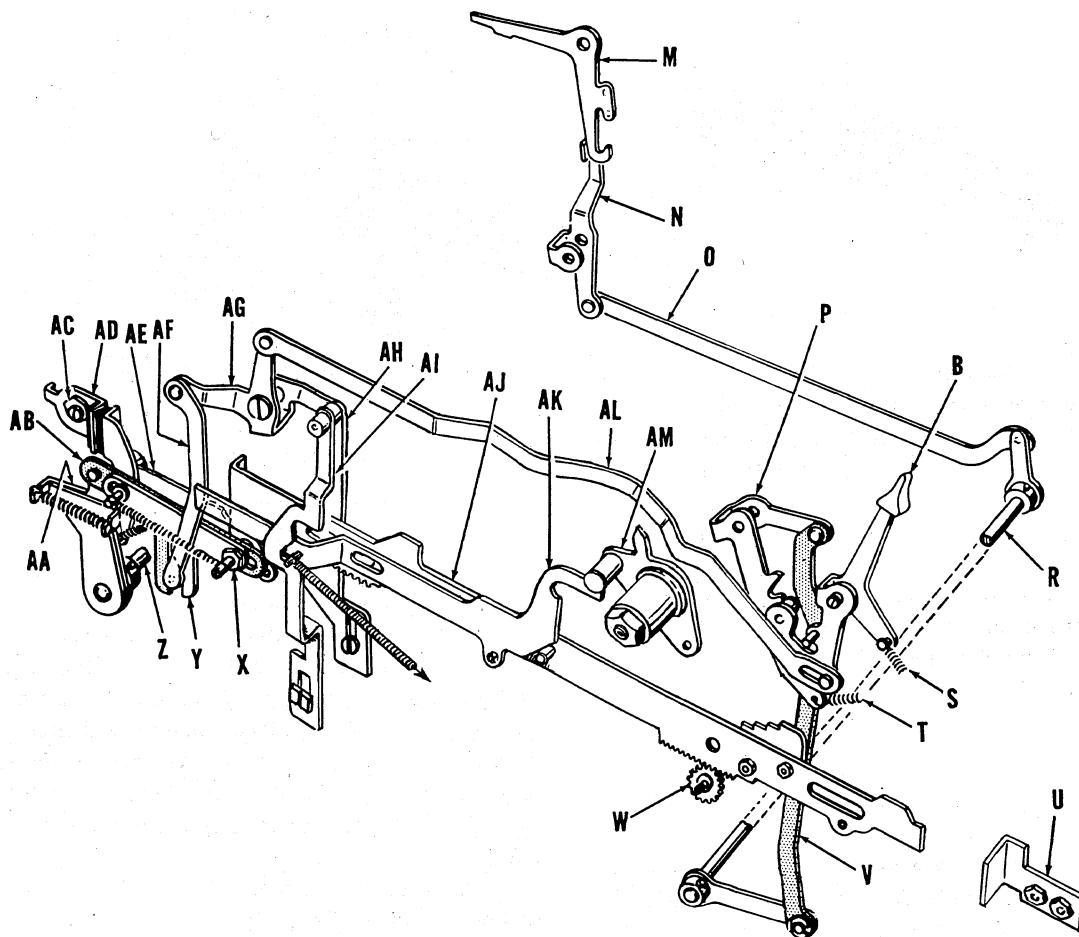


Fig. VII-96

Selection of Registers No. 1 and No. 3

With the selector lever shifted to position "A" link AL is moved rearward to hold link AF in its lowered position and to hold register No. 3 overthrow limit AH upward, which positions the arm of AH in the path of the formed ear of register selection rack AJ. When link AL is moved rearward, it also holds link AI in its upper position. With link AI in its upper position, the booster slide AK is inactive when actuated by roll on cam AM.

Since register No. 1 is in active position when the machine is normal, no controls are required to select register No. 1. Register No. 3 is selected when a No. 3 control pin in lane 25 causes the sensing lever in lane 25 to rock shaft assembly Z. Rocking shaft assembly Z moves arm AA and link AB forward to move register sel-

ection rack AJ forward through eccentric X. Register selection rack AJ limits against the arm of link AH and shifts register No. 3 into active position through gear W. The Sensing action of the No. 3 pin in lane 25 lowers the register No. 2 limit AE to clear the formed ear on rack AJ.

Selection of Registers No. 2 and No. 4

When selector lever B is moved rearward to position "B", link AL is moved forward rocking bellcrank AG to lower the register No. 3 overthrow limit AH to inactive position; and also moves link AF upward. The upward movement of link AF cams link Y forward to move the register selection rack AJ forward through eccentric X. This forward movement of rack AJ partially indexes register No. 2. Rocking bellcrank AG also lowers link AI so the stud in the booster slide will be

blocked. This stud blocked, rearward movement of booster slide AK is prevented. At the beginning of each machine cycle, the roll on cam AM actuates slide AK. Since rearward movement of slide AK is blocked by link AJ, the downward movement of AK moves register selection rack AJ forward through the roll on rack AJ. This additional forward movement of rack AJ is sufficient to fully shift register No. 2 into active position. Hook AE prevents overthrow of register No. 2. With selector lever shifted to position "B" and the register selection rack AJ held forward so register No. 2 will be indexed at normal through links AF and Y; rocking of shaft assembly Z from a No. 3 control pin in lane 25 moves register selection rack AJ forward to shift register No. 4 into active position. Part U prevents overthrow of register No. 4.

Character Indexing

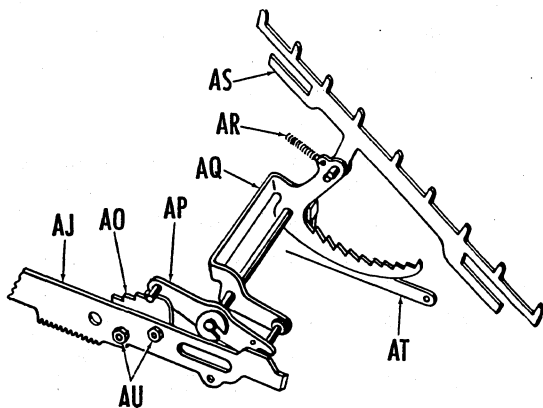


Fig. VII-97

Characters which identify the selector lever position are indexed from the register selection rack through plate AO. The characters are printed to the right of the accumulator "B" symbols. Identical characters are indexed from registers 1 and 3 and other identical characters are indexed from registers 2 and 4.

Early in the machine cycle, when register selection rack AJ is indexed to the proper register position, the corresponding step of plate AO is positioned in line with the stud in arm AP. As the machine operation continues and the index strip restoring shaft moves away from index strip AS, spring AR rocks arm AP, through index rack

AQ, to limit on the step of plate AO and position the corresponding step of index rack AQ into the path of the formed ear of rack AT. When the adding rack actuating shaft moves forward, rack AT is moved forward to limit on the step of index rack AQ and raise the type bar to printing position through the cluster gear unit.

Tests and Adjustments

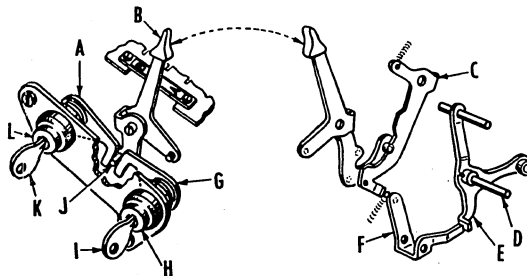


Fig. VII-98

A31-1 With selector lever B in its center position and the "A" and "B" Teller locks in their locked positions, stud J should align centrally between locking arms G and A.

TO ADJUST, move lock mounting plate.

REASON: To provide uniform locking of the selector lever in all three positions.

A31-2 With the machine normal and selector lever B in its center position, the rear arm of bail F should have no less than full side hold on formed ear E.

TO ADJUST, bend the rear arm of bail F.

REASON: To provide no less than full side hold of the rear arm of bail F with the formed ear on the left arm of shaft D.

A31-3 With selector lever B shifted to the "A" position, depress Motor Bar 2. There should be no less than .010" clearance between the rear arm of bail F and the bottom edge of formed ear E.

TO ADJUST, weave bail F.

REASON: To permit tripping the drive.

NOTE: Check the above test to be identical when selector lever B is shifted to the "B" position.

A31-4 With selector lever B in its center position, depress Motor Bar 2. The rear arm of bail F should have no less than 1/2 vertical hold on ear E.

TO ADJUST, recheck adjustment A31-3.

REASON: To prevent tripping the drive.

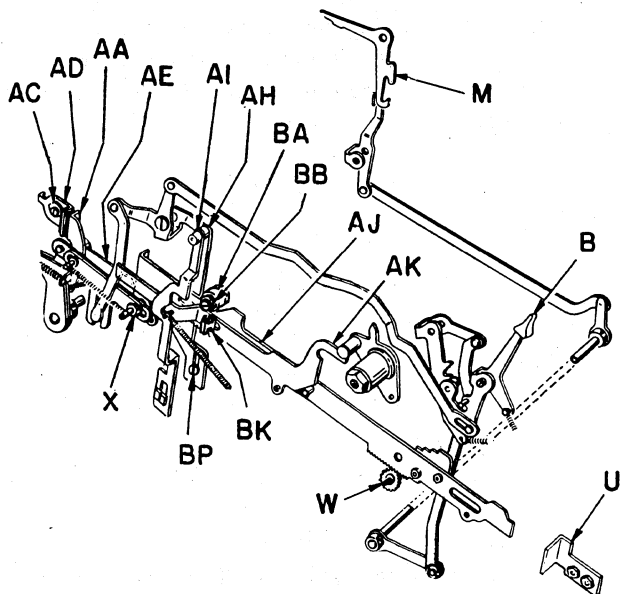


Fig. VII-99

A31-5 There should be .001" to .003" clearance between the hold down roll and register selection rack AJ in all selected positions.

TO ADJUST, turn eccentric BB to position roll BA.

REASON: To limit the upward thrust of register selection rack.

A31-6 With the machine normal, and a .016"

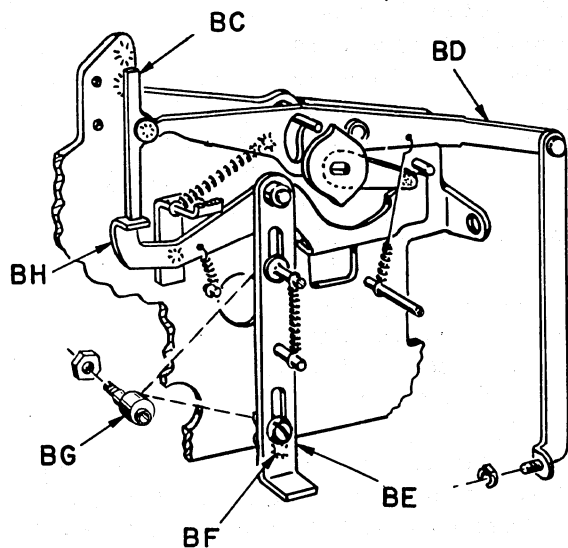


Fig. VII-100

gauge inserted between the limit pad of the sensing lever guide comb and lever BD, turn the high side of lower eccentric BG downward to avoid a false limit of tappet BC. Hold lever BD to limit tappet BC on its lower guide plate. The formed ear of assembly AA should limit against rubber bumper AD.

TO ADJUST, turn eccentric AC.

REASON: To provide clearance between the limit pad and lever BD, and to prevent tappet BC from bouncing up into the path of the pins in the control panel as lever BC restores to normal.

A31-7 With the machine normal and selector lever B in its center position, there should be .093" clearance between the front edge of the rear slot in register selection rack AJ and the rear guide post.

TO ADJUST, turn eccentric X.

REASON: To establish the normal position of rack AJ.

A31-8 With the machine normal and lane 25 sensing lever manually held to limit tappet BC against its lower guide plate, and stud BF in link BE limited upward against lower eccentric BG, there should be no less than .003" clearance between tappet BC and lip BH.

TO ADJUST, turn lower eccentric BG.

REASON: To prevent a false limit of tappet BC in normal position.

A31-9 With selector lever B shifted to the "B" position and a No. 3 pin active in lane 25, manually cycle the machine. The formed lip of rack AJ should have .015" to .020" clearance over the step of overthrow limit AE.

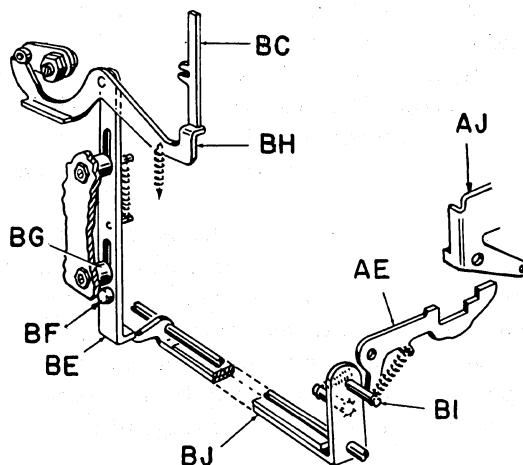


Fig. VII-101

TO ADJUST, weave the left arm of bail BJ to tip stud BL.

REASON: To prevent trapping register selection rack AJ on the step of overthrow limit AE.

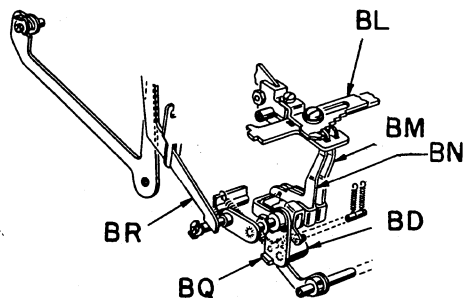


Fig. VII-102

A31-10 With the machine manually operated until drive arm BR receives its maximum throw register release hammer BO should have .010" to .030" latching lead over latch BQ.

TO ADJUST, weave arm BR.

REASON: To permit detents BM and BN to engage the steps of index plate BL.

A31-11 With register selection rack AJ normal and release hammer BO rocked manually, detent BN should move rearward with slight clearance of the No. 1 step of index plate BL. When slight pressure is applied to the right on plate BL, detent BN should "hang up".

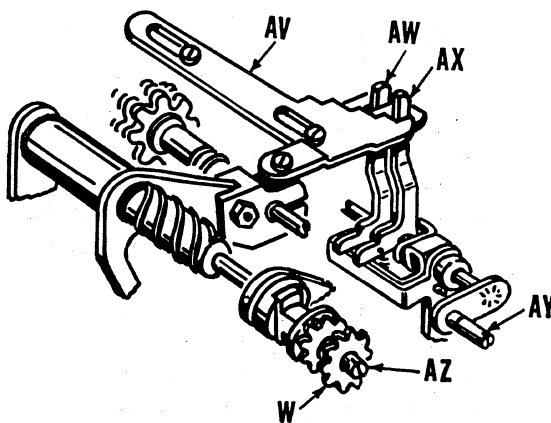


Fig. VII-103

TO ADJUST, remesh gear W with rack AJ. If after making this adjustment (with lever B shifted to "B" position and a No. 3 pin active in lane 25) the register is not retained in a No.

4 position by detent BM, return the machine to normal and relocate gear W by turning it counter-clockwise one tooth at a time.

REASON: To ensure positive indexing of the selected register.

A31-12 With lever B shifted to "B" position and a No. 3 pin active in lane 25, manually cycle the machine until rack AJ is completely forward. There should be .005" to .010" clearance between the front rack AJ and overthrow limit U.

TO ADJUST, bend limit U.

REASON: To prevent overthrow of rack AJ when selecting No. 4 register.

A31-13 With lever B shifted to "B" position and no pin active in lane 25, manually cycle the machine until booster slide AK cams rack AJ completely forward. Detent BM should move rearward with slight clearance of the No. 2 step on plate BL.

TO ADJUST, turn eccentric in AI.

A31-14 With lever B shifted to the "A" position and a No. 3 pin active in lane 25, manually cycle the machine until rack AJ is completely forward. There should be .005" to .010" clearance between the rear formed ear on rack AJ and the overthrow limit on link AH.

TO ADJUST, loosen screw in bottom of AH and turn the eccentric collar.

REASON: To prevent overthrow of rack AJ when selecting No. 3 register.

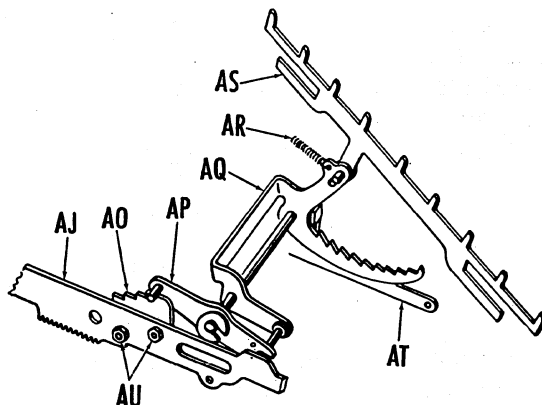


Fig. VII-104

A31-15 With lever B shifted to "B" position and no pin active in lane 25, manually cycle the machine until rack AJ is completely forward.

The rear edge of stud in AP should be in line with the rear edge of the second step from the top of plate AO.

TO ADJUST, reposition plate AO.

REASON: To ensure correct designation of the selected register.

A31-16 NOTE: With lever B shifted to "A" position and a No. 5 pin active in lane 14, manually cycle the machine until the lane 14 bell-crank M receives its maximum throw. Lever B should restore to its center position. Check the above to function identically with lever B shifted to "B" position.

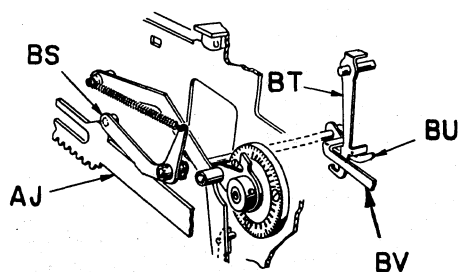


Fig. VII-105

A31-17 With the machine and clutch release latch normal, manually lower overthrow limit AE and move rack AJ forward until roll on arm BS limits on the flat surface of rack AJ. There should be no more than .050" clearance between the formed ear of latch BT and the vertical surface of interlock BU.

TO ADJUST, weave the ear of latch BT.

REASON: To provide additional time between machine operations when selecting registers 3 or 4.

Register Selection from Keys in Columns "1" and "0"

Machines containing this feature provide the operator with a method of indexing all 18 registers of a Series F500 from depression of the keyboard register selection keys in columns "1" and "0". In a single carriage position the operator can distribute the posted items in one of the 18 registers by depression of one of these keys. Depression of keys in column "0" will select registers 1 through 9 in the "C" section and non-

add the "B" section. Depression of keys in column "1" will select registers 1 through 9 in the "B" section and non-add the "C" section. Depression of keys in columns "1" or "0" also indexes characters to identify the various registers selected in the two sections.

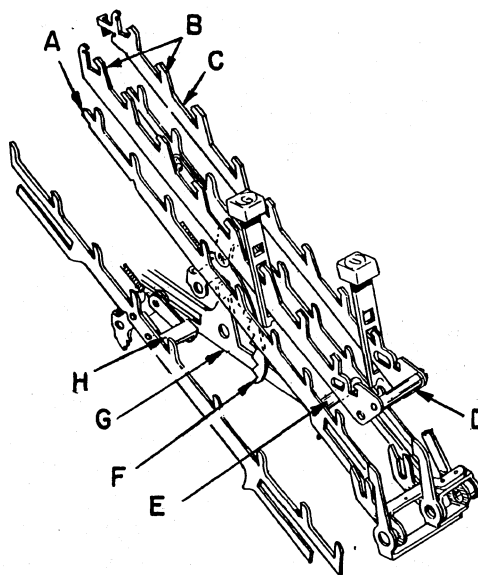


Fig. VII-106

Depression of keys in column "1" or "0" selects registers 1 through 9 in the conventional manner; i. e., the depressed keystem limits index strip A or C, which positions index rack F to limit the forward travel of the register indexing rack G. Columns "1" and "0" index strips A and C are connected with tie shaft E; therefore, simultaneous depression of keys in both columns results in selection of the lowest number register indexed on the keyboard. Locking slides B are assembled with tie shaft D so depression of a key in one column releases the keys depressed in the opposite column. Since there are register selection keys in column "1", the index strips in the amount columns have tie strips H added to bridge each index strip one place to the right so the amount keys, shifted one column to the left on the keyboard, will position their respective index racks which are located in their original position.

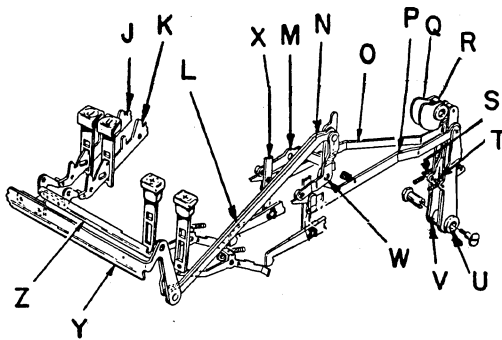


Fig. VII-107

When a key is depressed in column "0" it cams actuating slide K forward to rock bail Z. The rocking of bail Z lowers link O through bellcrank M and link N. With link O lowered, the hook in its forward end is latched over the stud in "B" subtract bellcrank X. During the machine cycle, at approximately 100°, cam Q on the main cam shaft moves link O rearward through spring S on the broken joint of lever V. The rearward movement of link O lowers the "B" add meshing hook to non-add position.

When a key is depressed in column "1", it cams slide J forward to rock bail Y. The rocking of bail Y lowers link P through bellcrank W and link L. During the machine cycle, register "C" is non-added in the same manner as register "B", but through parts R, T and U.

Note: On early machines both links O and P were connected to a single lever V actuated by a single cam Q. Because of this construction, the depression of either add key would cause both sections to add superseding the non-add mechanism indexed by keys in columns "1" and "0".

Depression of either register "B" or "C" add keys supersedes the non-add mechanism indexed by keys in columns "1" and "0". With either register "B" or "C" add key depressed the subtract linkage is limited; therefore, during the machine cycle the broken joint on levers V and U will cause springs S and T to be expanded when cams Q and R actuate levers V and U, thus permitting the amounts to add into the indexed accumulator.

Depression of either register "B" or "C" subtract bars also supersedes the non-add mechanism indexed by keys in columns "1" and "0". Also, in a carriage position where a "B" or "C" subtract pin is active the carriage controlled subtract supersedes the non-add mechanism indexed by keys in columns "1" and "0".

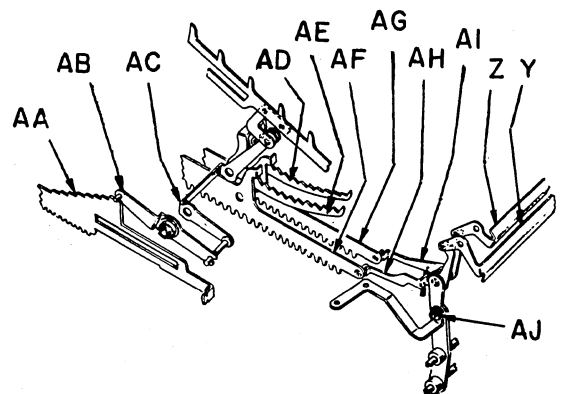


Fig. VII-108

Characters to identify the registers selected from keyboard columns "1" and "0" are indexed from the steps on register selection rack AA. When stud AB limits on a step of the register selection rack, index racks AD and AE are positioned through bail AC. Register designation racks AF and AG are blocked by fingers AH and AI when there are no keyboard register selection keys depressed. When a key is depressed in column "0" it rocks bail Z. Rocking of bail Z raises finger AI and releases the "C" register designation rack. The "B" register designation rack remains blocked, allowing only the "C" register characters to print. When a key in column "1" is depressed it rocks bail Y. The rocking of bail Y raises finger AH and allows only the "B" register character to print.

Depression of keys in both columns "1" and "0" will provide a print of the characters in both printing columns corresponding to the lowest key depressed.

On the Style F511 machine the "B" register designation is printed in printing position 14 and "C" register designation is printed in printing position 13. On Style F512 machines the "B" and "C"

register designation is printed in printing positions 1 and 2 respectively. Since the keyboard and indexing mechanism of both styles are essentially the same, the printing of the register designation characters and the amounts in various positions in the printing section is done through the cluster gear unit.

The Style F513 machine has 9 column listing and totaling capacity and characters are indexed to print in printing positions 10 through 14 from register selection keys in columns "1" and "0". A total of 5 characters may be printed in printing positions 12, 13 and 14 to identify the keyboard selected registers in the "B" section and a total of 3 characters to print in printing positions 10 and 11 to identify keyboard selected registers in the "C" section. The two register designation racks are controlled on the F513 in the same way as the F511 and F512. The "B" register designation rack, through the cluster gear unit, indexes type bars 12, 13 and 14 and the "C" register designation rack indexes type bars 10 and 11.

Tests and Adjustments

A1-1

A. With a register selection key in position No. 1 in column "1" or "0" depressed, the respective character designation rack AF or AG should be released by arm AH or AI being raised clear of the stud in the forward end of the rack.

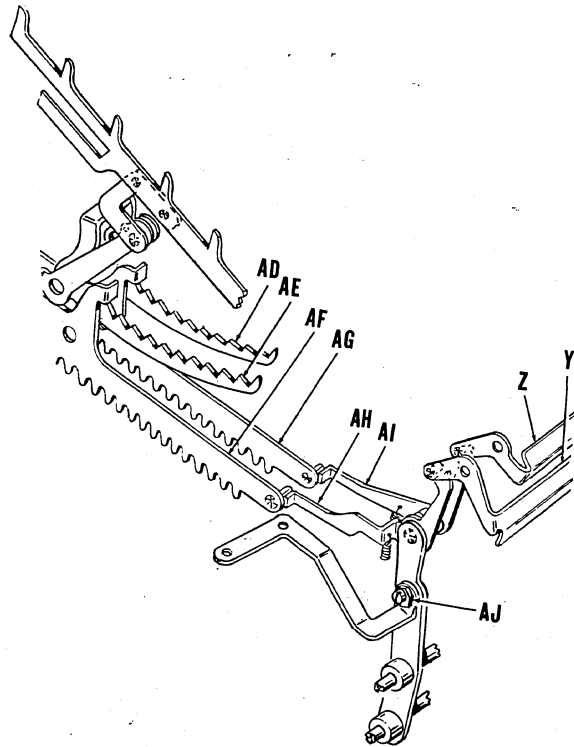


Fig. VII-109

A1-2 With no keys depressed in columns "1" and "0" and the machine cycled to 110°, the studs on racks AF and AG should enter freely into the tooth spaces of the lock plates.

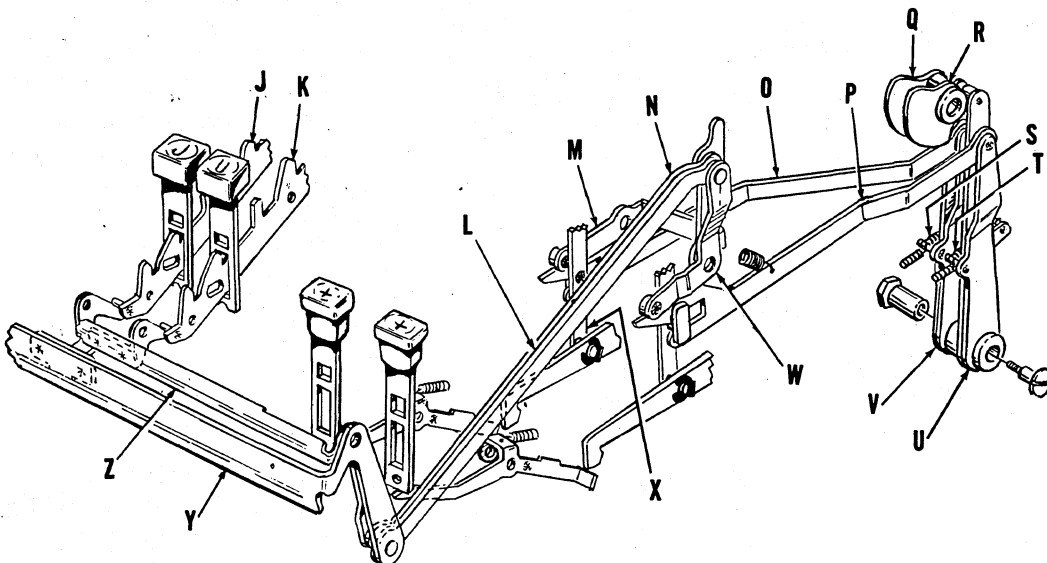


Fig. VII-110

TO ADJUST,

- A. For both columns, turn eccentric AJ.
- B. For individual adjustment, weave the formed ear of arm AH or AI.
- B. With no register selection keys depressed, the formed ears of arms AH and AI should block racks AF and AG.

TO ADJUST, weave the left portion of bails Y and Z.

REASON: To ensure indexing characters to identify keyboard selected registers and to prevent indexing characters during carriage controlled selection.

REASON: To ensure free entry of the studs on racks AF and AG into the tooth spaces of the lock plates.

A1-3 With a key depressed in register selection column "1", there should be .010" to .015" clearance between the upper surface of the slot in link P and slotted guide stud in "C" subtract bellcrank.

TO ADJUST, weave the right end of bail Y.

REASON: To ensure that the hook portion of link P will have full contact on slotted guide stud, and to lower the accumulator "C" meshing hook to non-add position during the machine operation.

A1-4 With a key depressed in register selection column "0", there should be .010" to .015" clearance between the upper surface of the slot

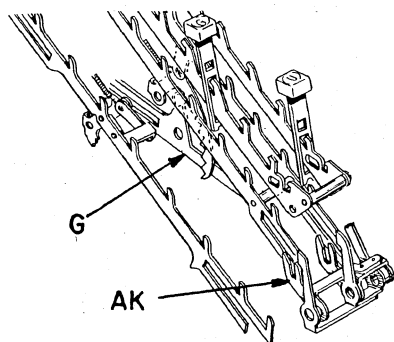


Fig. VII-111

in link O and the slotted guide stud in bellcrank X.

TO ADJUST, weave the right end of bail Z.

REASON: To ensure that the hook portion of link O will have full contact on the slotted guide stud in bellcrank X, and to lower the accumulator "B" meshing hook to non-add position during the machine operation.

A1-5 When a key is depressed in either column "1" or "0" it should cam its respective locking slide sufficiently to release the key in the opposite column.

TO ADJUST, turn eccentric hex post D to obtain an equal amount of throw of the locking strips from the keystems in both columns.

REASON: To ensure restoration of a key in the opposite column.

NOTE: When certain keys in the same column fail to provide enough throw of the locking slides to release keys in the opposite column, it may be necessary to bump the individual key-stems forward or rearward to obtain the correct relationship between the keystems and locking slides of the two columns.

A1-6 With register selection keys No. 1 in columns "0" and "1" normal, the front stud on rack G should clear under the lower formed ear of bellcrank AK.

With a register selection key No. 1 in column "0" or "1" depressed, the stud should be blocked by the lower formed ear of bellcrank AK.

TO ADJUST, weave bellcrank AK.

REASON: To ensure selecting register No. 1 from keyboard control.

A1-7 With a register selection key No. 1 in column "0" or "1" depressed and the machine cycled to 110°, the stud on rack G should enter freely into the tooth space of the lock plate.

TO ADJUST, bend the lower formed ear of bellcrank AK forward or rearward.

REASON: To ensure free entry of the stud on rack O into the tooth space of the lock plate.

REGISTER SELECTION KEYS—COLUMNS "0"
AND "1" TO OPERATE MACHINE, WITH
DISABLING KEY IN POSITION 2C

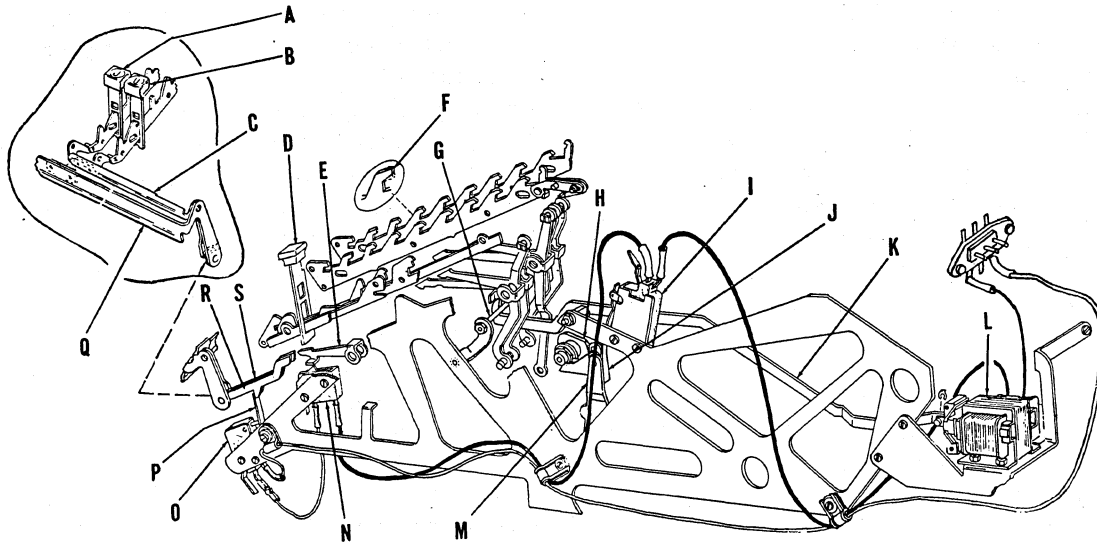


Fig. VII-112

As slide R or S is actuated by depression of a key in column "0" or "1", projections on the slides moves switch lever P forward, closing switch O, thus completing electrical circuit to solenoid L. When solenoid L is energized, its plunger pulls drive trip stud G rearward through link K.

Normally closed switch I is opened during machine operation by action of cam H moving assembly M rearward which, in turn, rocks switch lever J; this action de-energizes the solenoid until switch O is back to its normally opened condition, preventing a repeat operation.

Depression of keys (A or B) in column "1" or "0" is aided by camming action of locking strips F, which have stock removed for this purpose (see dotted portion in insert).

The formed ears on register "B" and "C" to total and sub-total bellcranks, which would normally trip the drive through stud G, have been removed to prevent conflict or misoperations.

The automatic tripping of the drive through depression of keys in column "0" or "1" may be disabled by a latch down key D in keyboard position 2-C. When key D is depressed, it lowers arm E which contacts normally closed switch N and opens the circuit so that closing of switch O will not complete the circuit to solenoid L.

Tests and Adjustments

A1-1-1 With the roll on bellcrank U limiting on link W and the roll on bail I limiting on link V the hole in bellcrank and bail for links R and S must be in alignment.

TO ADJUST, weave bail T as required.

REASON: To ensure that the projection on links R and S will provide equal movement of switch actuator P when links R and S are activated by the depression of a key in column "0" or "1".

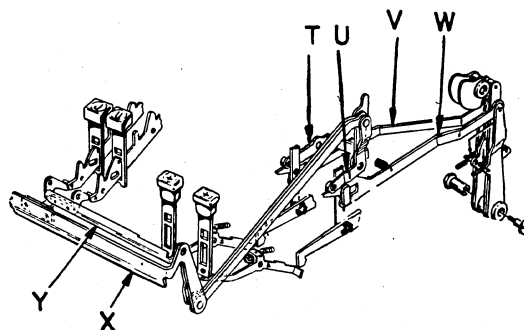


Fig. VII-113

A1-1-2 Projections on links R and S should have a full hold on switch actuator P and side play of links R and S should be at a minimum.

TO ADJUST, bend arms of bails X and Y to the right or left as required.

REASON: To ensure indexing switch actuator P.

A1-1-3 Switch O contacts should not be transferred until active locking slide F has started to move rearward on a slow key depression of each key in columns "0" and "1".

TO ADJUST, bend switch actuator arm P.

REASON: To ensure latching the depressed key prior to tripping the drive.

A1-1-4 With disabling key D latched down, there should be approximately $3/32$ " clearance between the formed ear of arm E and the body of switch N.

TO ADJUST, bend the formed ear of arm E as required.

REASON: To ensure transferring contacts of switch N and prevent energizing solenoid there by disabling drive trip from key in column "0" and "1".

A1-1-5 With the power off manually trip the drive. There should be .015" to .025" clearance between post G and the hook on link K when the plunger of solenoid L is manually moved to its rearward limit.

TO ADJUST, move solenoid L forward or rearward as required.

REASON: To ensure tripping the drive when the solenoid is energized and to prevent excessive overthrow of post G.

A1-1-6 With the machine normal and switch actuator J limiting against arm M, visually check switch actuator J to hold plunger of switch I depressed by .015" to .020".

TO ADJUST, bend switch actuator J as required.

REASON: To prevent energizing solenoid L before register selection keys in column "0" and "1" are restored.

NOTE: Over adjustment of switch actuator will cause failure of the solenoid to be energized when a register selection key is depressed in column "0" or "1".

LOCK AND KEY MECHANISMS

Lock and key mechanisms are used to prevent machine operation and keyboard manipulation by unauthorized persons, and to prevent ac-

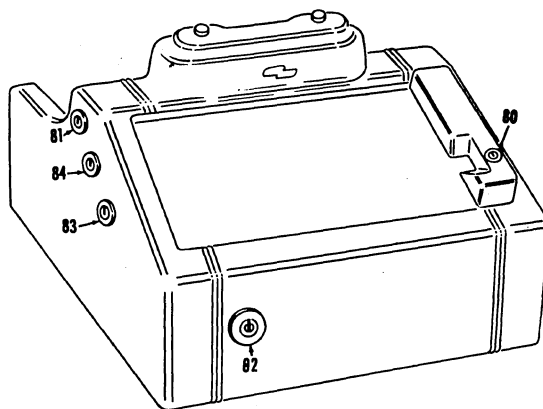


Fig. VII-114

cidental changing of the calendar feature by unauthorized persons or by the operator during a posting run.

Lock and key mechanisms located on the control key cover, and machine case panels are designated by an 80 series of numbers for reference purposes; i. e., 80, 81, 82, etc.

Housing G, lock nut E, screw A, and lock washer B are basic components of the lock assembly while mounting bracket F, washer C, and operating cam or lever D vary with the tumbler and key according to the function of the lock.

COVER WITH LOCK AND KEY MECHANISM, FOR OPERATION CONTROL KEYS, POSITION 80

A cover containing a lock and key mechanism prevents the use of accumulator control keys during posting operations, but permits their use for audit purposes by authorized persons when cover is unlocked and removed.

Cover A encloses all of the control keys with the exception of the error key, and is applicable to machines having either two or three columns

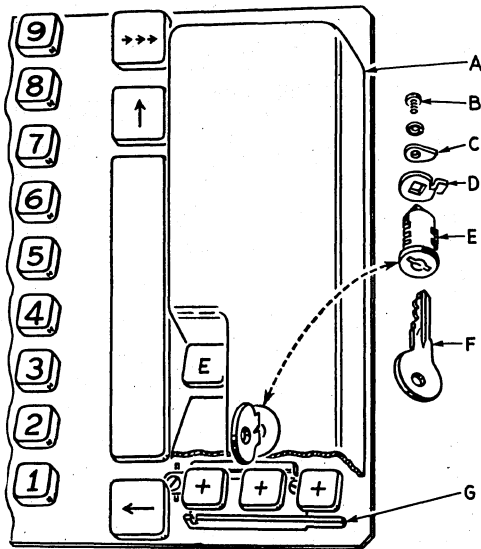


Fig. VII-115

of operation control keys. Cover A is locked in place on the keyboard when the formed ear of latch D is rotated into position under bracket G by key F. Limit C restricts the rotation of tumbler section E in locked position to permit easy removal and insertion of key F.

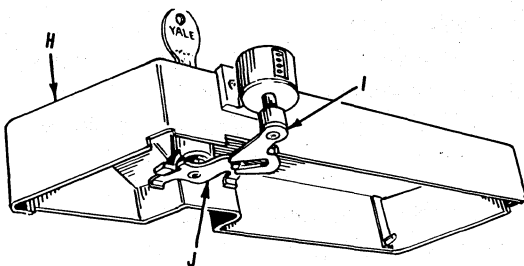


Fig. VII-116

Cover H has a non-reset counter riveted on the side to count each time the key is turned to locked position, giving a record to authorized persons the number of times the cover has been removed. When the key is turned counter-clockwise, to lock the cover, the stud in lever J actuates counter arm I to advance the counter.

Tests and Adjustments

K4-1 With lock in its locked position, key should insert and remove easily (teeth up).
TO ADJUST, locate limit C as required.
REASON: To align lock tumblers with slot in lock barrel.

LOCK AND KEY MECHANISM TO PREVENT CHANGING KEYS IN DATE SECTION, POSITION 82

The date repeat bail is operated by a lock and key mechanism to prevent changing of the date section by unauthorized persons during a posting run.

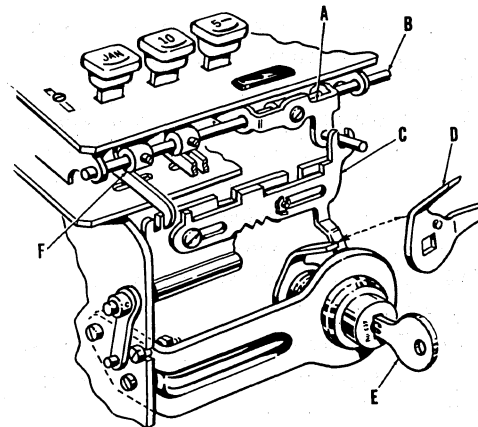


Fig. VII-117

With the shifting lever of bail A removed, the counterclockwise turning of key E is required to drive bail A to the left to allow the date keys to be indexed. Indexed date keys are prevented from restoring from machine operation, depression of the error key, or other date keys, when lever D is turned clockwise by Key E to drive slide C to the right. This position aligns the cutouts of slide C and collars F of shaft B with the keystem locking strips to prevent the keystems being released.

Tests and Adjustments

K2-1 NOTE: With lock in its locked position, key should remove and insert easily (teeth down.)
K2-2 With lock in its locked position, slide C

should be detented to its rightmost position.

TO ADJUST, weave finger on slide C as required.

REASON: To prevent indexing of calendar feature keys.

K2-3 With lock in its unlocked position, C should be detented in its leftmost position.

TO ADJUST, recheck adjustment K2-2.

REASON: To allow indexing of the calendar feature keys.

LOCK AND KEY MECHANISM TO PREVENT CHANGING THE ROTARY DIAL CALENDAR FEATURE, POSITION 82

A lock and key mechanism is used to prevent changing the rotary dial indexed calendar feature by the operator or by unauthorized persons during a posting run.

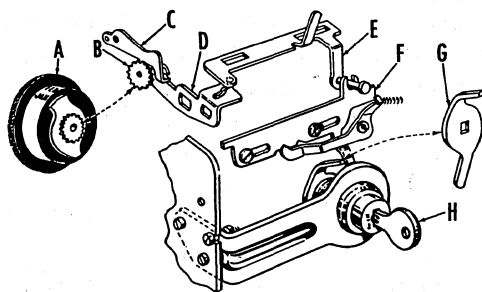


Fig. VII-118

Clockwise rotation of key H through slides F and E cams slide D forward to position its upper projections over the formed ears of detent C to prevent rotation of star wheel B on dial A.

With key H rotated counterclockwise and lever E shifted to the left, the rotary dials may be rotated to the desired setting.

Tests and Adjustments

K5-1 With lock in its unlocked position, key should insert and remove easily (teeth down).
TO ADJUST, weave straight tail of cam G as required.

REASON: To align lock tumblers with slot in lock barrel.

K5-2 With lock in locked position and key removed, the rotary date dials should be locked against rotation when the play of the date con-

trol lever is taken up to the left.

TO ADJUST, weave offset tail of cam G as required.

REASON: To prevent manipulation of date dials in the locked position.

K5-3 With lock in its locked position, key should insert and remove easily (teeth up).

TO ADJUST, recheck adjustment K5-2.

REASON: To align lock tumblers with slot in lock barrel.

LOCK AND KEY MECHANISM TO PREVENT MACHINE OPERATION, POSITION 81

A lock and key mechanism is used to operate an electric line switch, to prevent the machine from operating and to protect the totals in window posting machines from unauthorized persons.

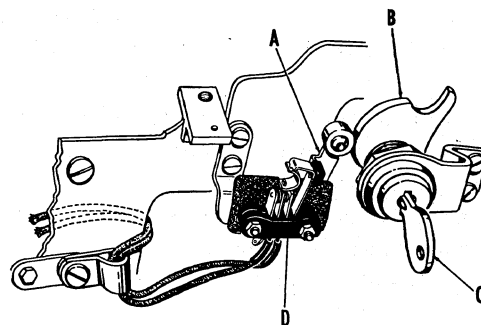


Fig. VII-119

When key C is rotated counterclockwise, cam B drives roll and arm A rearward. The rearward movement of arm A, through the toggle spring, closes the switch points of switch D to complete the electrical circuit to the motor, thus permitting the machine to operate.

When key C is rotated clockwise, cam B permits the forward movement of arm A, through the toggle spring, to open the points of switch D, thus opening the electrical circuit to the motor.

Tests and Adjustments

P5-1 NOTE: With lock in its locked position, key C should remove and insert easily (teeth down).

REASON: To align the lock tumblers with the slot in the lock barrel.

P5-2 NOTE: With lock in its unlocked position, the roller on arm A should seat in the pocket of cam B.

REASON: To provide positive detenting of the lock in its unlocked position.

P5-3 With lock in its unlocked position, switch D should be closed.

TO ADJUST, weave arm A to position its bakelite ear.

REASON: To provide electrical continuity to the motor.

P5-4 With lock in its locked position, switch D should be opened.

TO ADJUST, bend the switch contact point.

REASON: To break electrical continuity to the motor.

TELLER SELECTOR LEVER CONTROLLED BY LOCK AND KEY MECHANISM, POSITIONS 83 AND 84

Locks and keys are used, in positions 83 and 84 to control the movement of the three position teller selector lever thus each of two operators by locking his respective lock, is protected against unauthorized entries being accumulated with his postings of withdrawals and deposits.

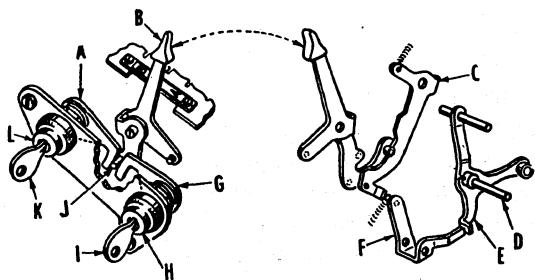


Fig. VII-120

With selector lever B in its center position and lock assemblies H and L in their locked positions, shifting of selector lever B is prevented by lock arms A and G blocking stud J. The machine operation is prevented by the arm of of bail F blocking arm E of of trip shaft assembly D.

Rotation of key K to its unlocked position raises arm A out of the path of stud J to permit shifting the selector lever forward to position "A". Rotation of key I to its unlocked position raises

arm G out of the path of stud J to permit shifting the selector lever rearward to position "B".

When the selector lever is shifted to position "A" or "B", the arm of bail F, through cam lever C, is lowered out of the path of the formed ear of arm E to permit a machine operation. Selector lever B is restored to its central position from a "Carriage open" operation following the posting of an account. Lock arm A or G may be rotated to locked position to retain stud J and selector lever B in indexed position for subsequent posting by the same operator. Keys K and I are removable only when arms A and G are in locked position.

Tests and Adjustments

K3-1 Keys K and I should remove and insert easily. (Teeth down.)

TO ADJUST, reposition lock in bracket.

REASON: To align tumblers with slot in barrel.

K3-2 With both locks in locked position stud J should be centrally aligned between A and G.

TO ADJUST, move mounting bracket as required.

REASON: To provide uniform locking of lever B in all three positions.

MECHANISMS TO PREVENT MACHINE OPERATION

There are several features containing mechanical and electro-mechanical devices which prevent machine operation. All of these features prevent machine operation for the purpose of warning the operator that an undesired condition or an error exists. The operator can then examine the account and make the required corrections.

MINUS BALANCE LOCK CROSSFOOTER "A" MOTOR BAR NO. 1 CONTROLLED

The minus balance lock prevents the printing of a crossfooter "A" minus balance in a carriage position selected by motor bar 1 with auxiliary motor bar repeat (lane 18) active.

The repeat of machine operation is prevented in the selected carriage position, with motor bar 1 indexed, by latch Q holding drive trip release arm R, when stud M is lowered by crossfooter "A" automatic one bail N, which is actuated when the balance in crossfooter "A" changes to minus. Stud M blocks hook lever L, thereby preventing the restoring of lever K and shaft assembly P.

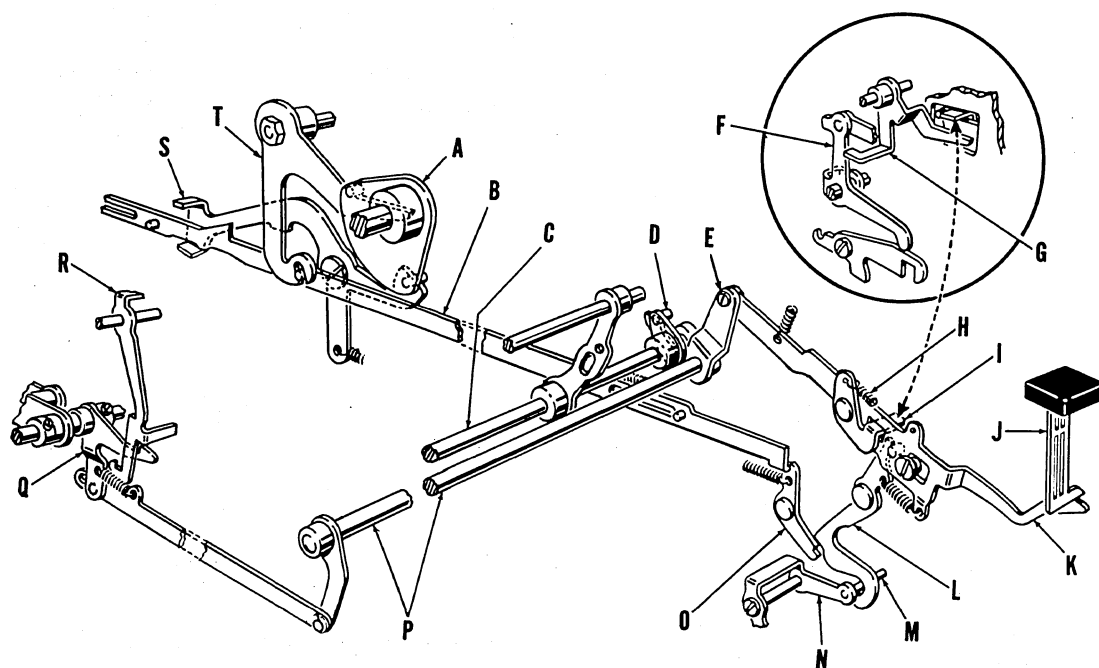


Fig. VII-121

On each machine cycle index strip restoring shaft C rocks shaft assembly P through stud D. The rocking of shaft P activates latch Q, and through the stud in lever K swings the hook on lever L out of the path of stud M on automatic one bail N. Lever L is latched in this position by latch O, activated early in the machine cycle when timer slide B is driven rearward by bell crank T. Lever L is retained in this latched position until the end of the machine cycle to provide the necessary timing for a relay carry to actuate the automatic one mechanism. At the end of the machine cycle, cam A raises bell crank S, allowing timer slide B to move forward and release latch O.

When crossfooter "A" contains a minus balance, stud M is in its lower position and will block lever L when it is released by latch O. With motor bar I retained in its indexed position by the auxiliary motor bar repeat, shaft assembly P is held in its rotated position by lever L, through lip I, holding latch Q active to lock drive arm R.

When the error key is depressed, restoring the drive trip mechanism and motor bar 1, lever K is also allowed to raise under spring tension, which

clears lip I over lever L. Shaft assembly P is then permitted to restore to normal and latch Q is released. A carriage directional key may be used to return the carriage to a position where a return item can be posted to correct the minus balance, or the minus balance may be printed by depressing motor bar 1. To permit motor bar 1 to be fully depressed, lip I limits on top of the upper portion of lever L, expanding spring H. The repeat of auxiliary motor bar 1 will be prevented until the nature of the balance in cross-footer "A" is changed to plus, which raises stud M to its upper position. With stud M in its upper position, it clears the hooked portion of lever L, allowing lever K and shaft assembly P to restore when latch O is released.

In a carriage position where motor bar 1 has been released with the error key and a sub-total of a minus balance in crossfooter "A" is printed, a repeat of motor bar 1 is allowed in the subsequent carriage stop position, due to subtotal hook F actuating bell crank G which raises lip I to an inactive position. With lip I raised, lever K and shaft P are permitted to restore to normal, allowing the drive to be tripped by motor bar 1.

The minus balance lock can be disabled by rehooking spring H in the hole near the rearmost portion of lever K. This holds lip I inactive.

Tests and Adjustments

A30-1 When motor bar No. 1 is depressed, lane 18 (MBR) active, and lever K moved to its rearmost position by rotation of shaft assembly C, latch O should have at least a half hold on the rearmost projection of lever L.
TO ADJUST, turn eccentric E as required.
REASON: To ensure latching lever L to provide the necessary timing for a relay carry to actuate automatic one bail N.

A30-2 When motor bar No. 1 is depressed, lane 18 (MBR) active, and arm K moved to its rearmost position by rotation of shaft assembly C permitting stud M to block lever L, latch Q should have secure hold on the lower formed ear of drive trip bail R.
TO ADJUST, weave the lower ear of drive trip bail R.
REASON: To ensure latching the drive trip bail to prevent printing a minus balance.

A30-3 When stud M is holding lever K rearward through latch I and crossfooter "A" subtotal linkage is indexed, lever G should raise the formed ear of latch I above the end of lever L.
TO ADJUST, weave the formed ear of latch I up or down.
REASON: To ensure disabling the minus balance lock from the crossfooter "A" subtotal linkage and permit a repeat of motor bar No. 1.

DRIVE TRIP INTERLOCK - CARRIAGE AND SOLENOID CONTROLLED

The electro-mechanical features that prevent machine operation do so by blocking the machine drive trip mechanism. Spring tension actuates an interlock to block the drive trip when the machine is at normal. A partial drive trip actuates a switch to energize a solenoid, making the interlock inactive and permitting the drive to trip. The electrical circuit, through which the solenoid is energized, may be controlled by different arrangements of switches for different fea-

tures. The individual components of the electro-mechanical features and their direct current power supply are explained in the following paragraphs. The arrangement of components for specific features is explained under the feature title.

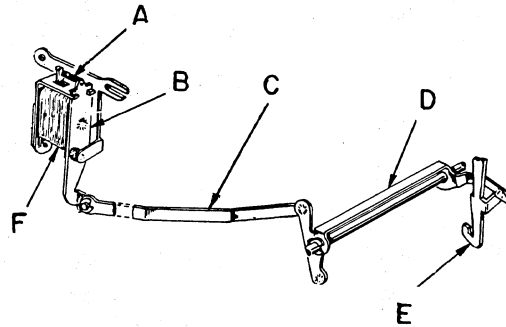


Fig. VII-122

Tension of spring A holds interlock D engaged with the formed ear of drive trip bail E when the circuit to solenoid F is opened. When a circuit is completed to energize solenoid F, movement of clapper B raises interlock D through link C, permitting the drive to trip.

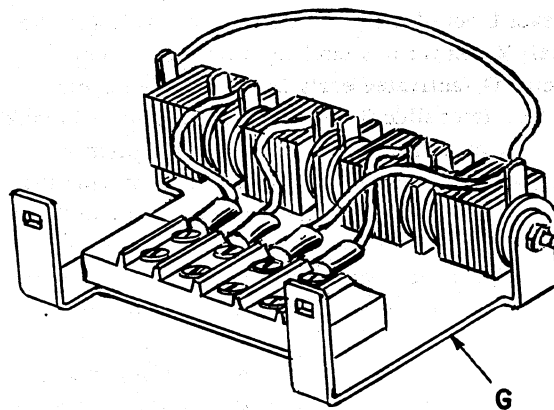


Fig. VII-123

DC current is used to energize the solenoid to release the interlock. Electrical components, mounted on the inside of the machine backplate, are used to change the AC current to DC current.

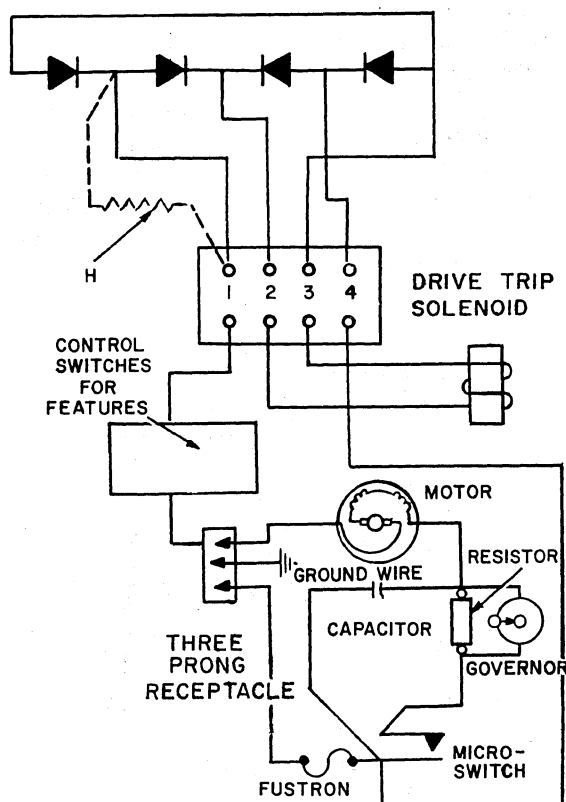


Fig. VII-124

A bridge type selenium rectifier G changes the AC electrical power to DC for the solenoid. The control switches for the interlock circuit are located on the AC side of the rectifier and the solenoid is on the DC side. Resistor H on the AC side of the rectifier is used with 150V, 220V and 240V AC power supplies to drop the voltage for safe operation of the rectifier and solenoid. Different arrangements of the control switches are described under the feature titles.

Drive trip switch K is located on the right auxiliary sideframe under the upper right hand corner of the keyboard. This switch, which is open when the machine is normal, is transferred when the drive is partially tripped. Result key restoring bail I moving rearward transfers the switch through actuator J. This completes a circuit to energize the solenoid and release the interlock, permitting the drive to trip. During the

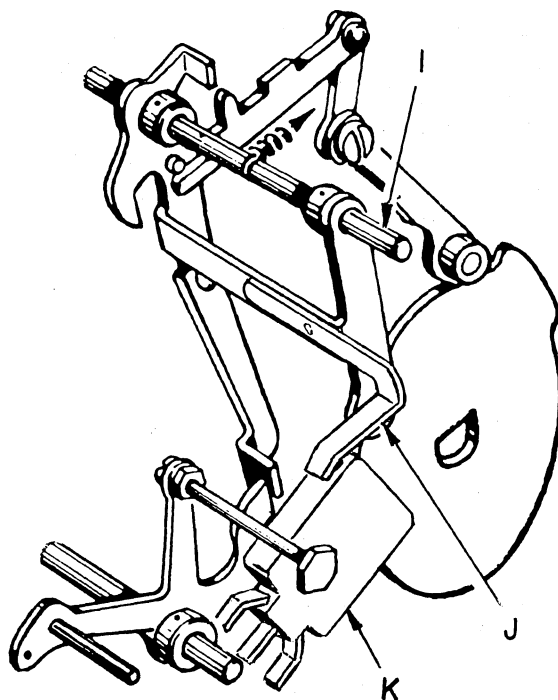


Fig. VII-125

machine operation other switches may be transferred to prevent the drive from tripping in subsequent stop positions.

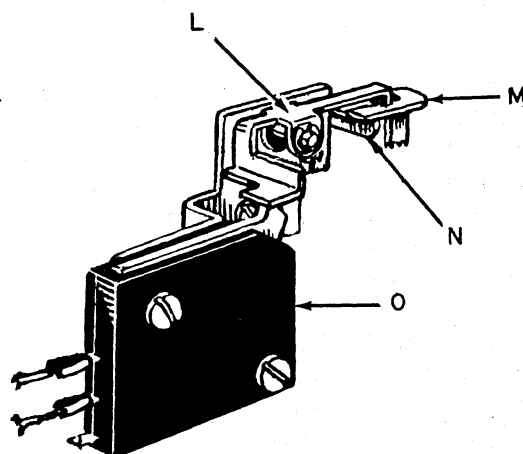


Fig. VII-126

In tab switch O is located on the left side of the carriage drive unit and is closed when the machine is normal to provide a circuit to the sol-

enoid. The in-tab switch is transferred any time the bumpers on the carriage drive unit are spread or depressed. This prevents energizing the solenoid when carriage movement is indexed or during carriage movement. When the bumpers are spread or depressed, lever N moving upward transfers in-tab switch O through latch M and lever L.

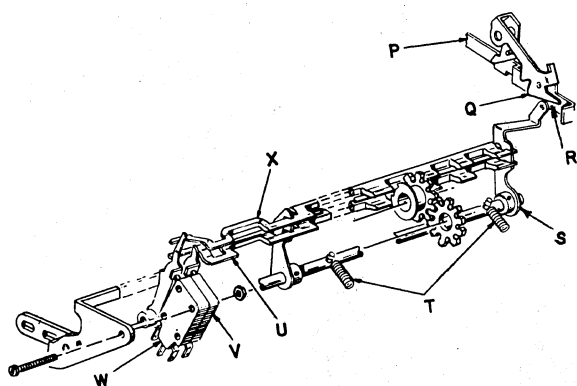


Fig. VII-127

Crossfooter sensing bail switches V and W are located on the left machine sideframe opposite the crossfooter. These switches are used to indicate whether the crossfooter is clear or has an amount on the add or subtract pinions. Switch W is closed when the plus pinions are clear and switch V is closed when the minus pinions are clear. Early in each machine cycle sensing bail assembly S is rocked rearward by the formed ear of register timing slide P. The sensing bail assembly S is rocked rearward by the formed ear of register timing slide P. The sensing bail assembly is latched in its rearward position by latch Q. The sensing bail assembly is unlatched near the end of the machine cycle when the timer slide restores and the stud in the timer slide raises latch Q to release stud R. This permits springs T to move the sensing bail assembly to sense the rear set of pinions. If the add pinions are clear, the cutouts in the flanges of the rear pinions are aligned with the projections of bail X so that the bail can move forward and retain switch W closed. If the rear pinions are at minus cipher position, the cutouts in the flanges of the rear pinions are aligned with the projections on bail U so that the bail can move forward and retain switch V closed. When either switch is closed it provides continuity. When there is either an add or subtract amount on

the pinions, the cutouts in the flanges of the rear set of pinions are out of alignment with either bail so that the bails cannot close either switch W or V. However, if the accumulated total in the crossfooter is all nines, either plus or minus, the crossfooter would have the appearance of being clear - as far as switches V and W are concerned. This requires another switch in the circuit to determine whether the crossfooter is in a plus or minus condition.

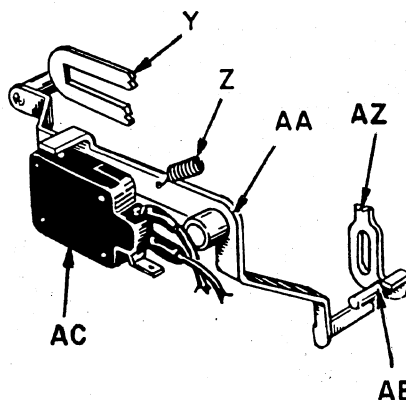


Fig. VII-128

Sign of crossfooter "A" switch AC, on the lower front end of the right auxiliary sideframe, indicates the condition of the crossfooter - plus or minus. The switch is a single pole - double throw type. When the crossfooter is in plus condition continuity is provided through one set of switch contacts and when the crossfooter is in minus condition the switch is transferred to provide continuity through the other set of contacts. Switch AC is transferred each machine operation by crossfooter "A" symbol slide Y moving forward and camming lever AA downward. If the condition of the crossfooter is plus, lever AA is restored to normal by spring Z when the "A" symbol slide restores to normal. However, when the condition of the crossfooter changes from plus to minus during the machine operation, stud AB is lowered into the path of the rear formed ear of lever AA holding switch AC transferred at the end of the machine operation.

Carriage control of the drive trip interlock solenoid is provided by one or two switches that are transferred by a control pin in the sensimatic control panel. The switch assembly is mounted on the back plate of the machine and switches AF

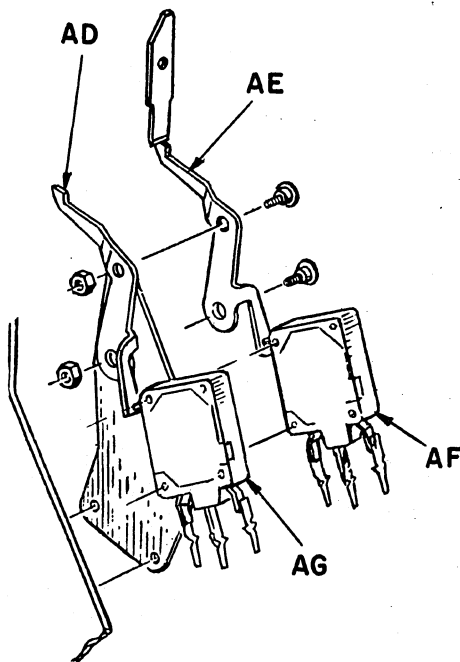


Fig. VII-129

and AG are referred to as lanes 25A and 25B respectively. When the carriage is located in a stop position that has a control pin in lane 25A or 25B, lever AE or AD will be rocked to transfer the switches. The results obtained from the switches will depend on how the switches are connected into the circuit.

Normalizing switch AL is located on the auxiliary right sideframe below the drive trip switch and can be transferred from different sources. This switch, which is normally open, provides an alternate means of energizing the solenoid to make the interlock inactive. The normalizing switch may be transferred to complete a circuit to the solenoid, energizing the solenoid and releasing the interlock. Normalizing switch AL may be transferred by depression of the crossfooter "A" total or subtotal key, motor bars No. 1 or No. 4 or accumulator "B" or "C" total or subtotal keys in the Crossfooter Non-Clear Lock Features and by accumulator "A" and "B" total or subtotal keys and the error correction keys in the Extended Overdraft Feature.

A motor bar, result key or error correction

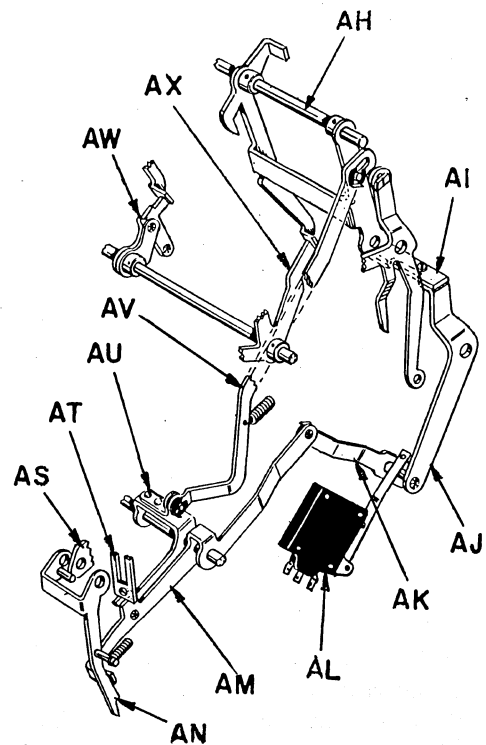


Fig. VII-130

key, when depressed, rocks their respective bellcranks to rock bail AJ through the projections on plate AI to transfer the normalizing switch. The projections on plate AI may be trimmed to prevent any bellcrank or combination of bellcranks from transferring the normalizing switch.

When the interlock prevents the drive from tripping, motor bar release key AT in keyboard position 2B may be depressed to partially reset the drive trip mechanism so that an alternate motor bar or control key may be depressed to transfer the normalizing switch. Key AT, when depressed, rocks lever AU to pull link AV and bail AH forward. Broken joints on arms AW permit arm AX to latch bail AH in its reset position. When latch AN, lever AM and link AK are in the machine, depression of key AT causes the normalizing switch to be transferred so that motor bar No. 2 can trip the drive. Latch AN holds lever AM rocked until released by keyboard locking slide AS at the end of the subsequent machine operation.

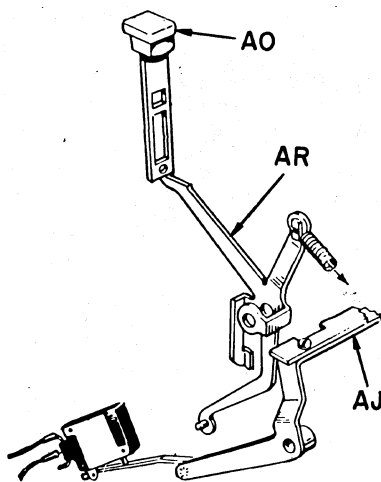


Fig. VII-131

Release key AO, located to the right of the "B" total key, when depressed, transfers the normalizing switch through bellcrank AR and bail AJ on machines with the Extended Overdraft Feature.

Extended Overdraft Interlock

This feature is provided specifically for bank posting applications to indicate to the operator the item that causes the account to be overdrawn. This feature, when indexed by a control pin in lane 25A prevents the drive from tripping anytime the crossfooter is in minus condition.

A circuit to energize the solenoid and release the interlock when the condition of the crossfooter is plus is provided through the drive trip switch, in tab switch and sign of crossfooter "A" switch as the drive is tripping. If the condition of the crossfooter changes to minus during this machine operation, sign of crossfooter "A" switch will be held transferred at the end of the machine operation. When there is a pin in lane 25A for the next machine operation, lane 25A switch will be transferred so that a circuit is not provided to energize the solenoid and release the interlock; thus preventing a subsequent drive trip. A decision must then be made as to whether the item causing the overdraft shall be accepted or returned. When the overdraft is accepted, depression of the release key causes the normalizing switch to be transferred, providing continuity through the drive trip switch, in tab switch, transferred sign

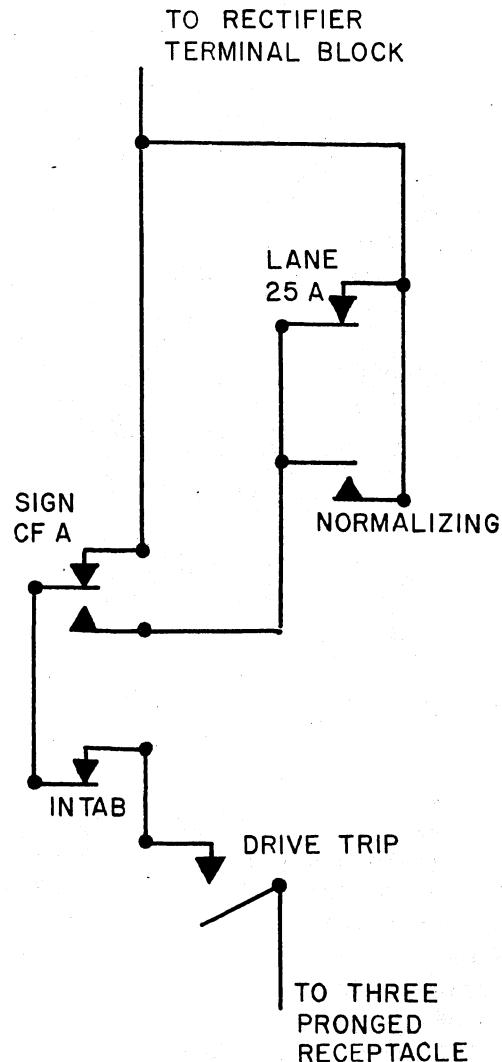


Fig. VII-132

of crossfooter "A" switch and transferred normalizing switch to energize the solenoid, release the interlock and permit the drive to trip. If the item that caused the overdraft is to be returned, the error key must be depressed to release the amount on the keyboard. Then the amount of the overdraft item is indexed on the keyboard and the appropriate correction key depressed. The correction key transfers the normalizing switch to provide a circuit to energize the solenoid, release the interlock and permit the drive to trip.

When another feature requiring use of lane 25A is in the machine, lane 25B can be used as the electrical lane for this feature.

Crossfooter Non-Clear Lock - Style 1

The crossfooter Non-Clear Lock - Style 1 feature is used to test the crossfooter for being clear before continuing the posting operation. When testing the crossfooter a plus or minus amount in the crossfooter will prevent the drive from tripping and a clear crossfooter will permit the drive to trip.

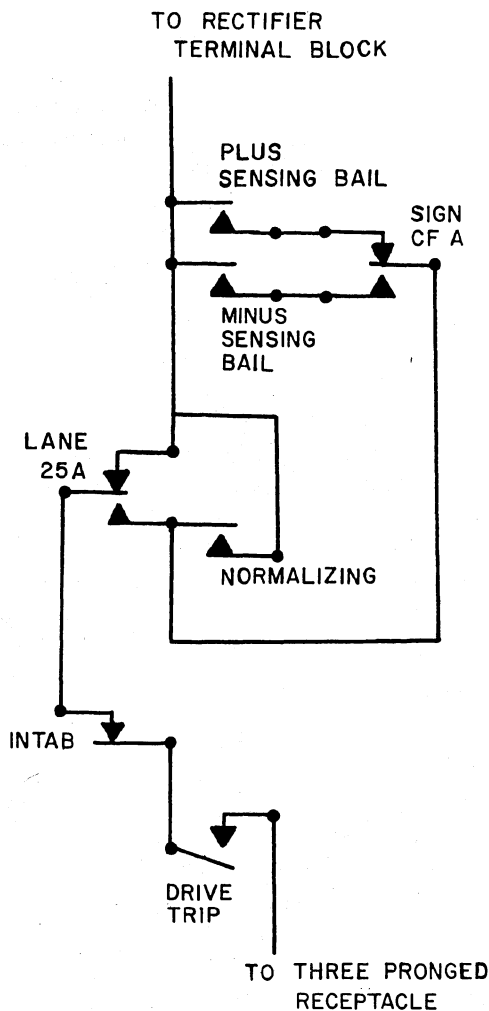


Fig. VII-133

The circuit for the Crossfooter Non-Clear Lock - Style 1 has seven control switches on the AC side of the rectifier. When the application does not require testing the crossfooter to be clear, the switch in lane 25A is as illustrated to that continuity to energize the solenoid and release the interlock is provided through the drive trip switch, in tab switch and lane 25A switch during drive trip. A pin is required in lane 25A to test the crossfooter. This pin transfers lane 25A switch. The plus and minus sensing bail switches are illustrated as indicating an amount on the plus or minus pinions. When the add pinions are clear, the plus sensing bail switch is closed and the minus sensing bail switch is open but when the minus pinions are clear the minus sensing bail switch is closed and the plus sensing bail switch is open. Therefore, when the sign of the crossfooter is the same as the pinions that are clear, the solenoid will release the interlock and permit the drive to trip. With an amount on the add pinions holding the plus sensing bail switch open and sign of crossfooter "A" switch in plus position (illustrated) or with an amount on the minus pinions holding the minus sensing bail open and sign of crossfooter "A" in minus position (transferred), the interlock will prevent drive trip. This indicates to the operator that there is an amount in the crossfooter. Depression of the motor bar release key partially resets the drive trip mechanism to permit an alternate motor bar or result key to be depressed and transfer the normalizing switch. This provides an alternate circuit to bypass the plus and minus sensing switches, energizing the solenoid to release the interlock and permit the drive to trip.

Crossfooter Non-Clear Lock - Style 2

The purpose of this feature is to prevent the machine from operating only when the crossfooter contains a minus amount.

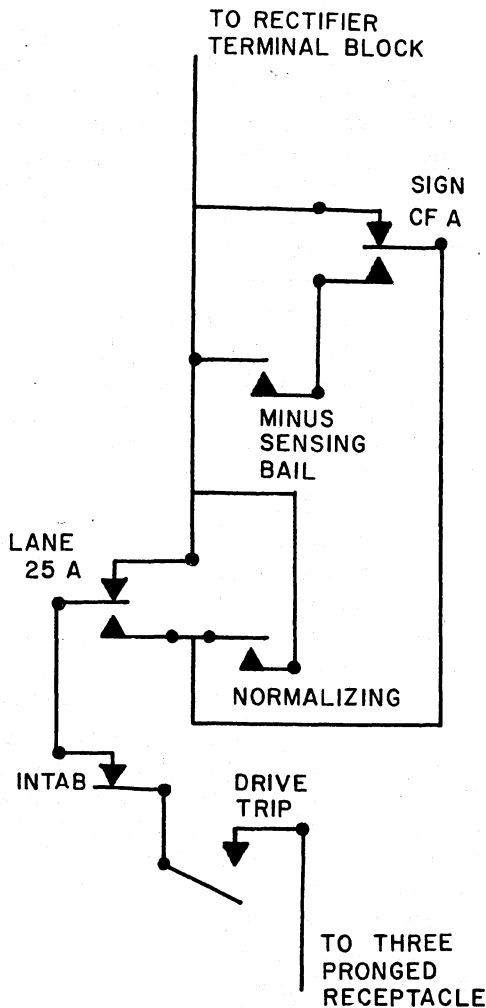


Fig. VII-134

The circuit for this feature is the same as for "Crossfooter Non-Clear Lock - Style 1" except that the plus sensing bail switch is omitted. Thus, the only time the drive is prevented from tripping is when the crossfooter is to be tested by a pin in lane 25A and the crossfooter contains a minus amount. The minus sensing bail switch is illustrated as indicating an amount on the minus pinions.

When the crossfooter is in plus condition and is to be tested, sign of crossfooter "A" switch is as

illustrated. This provides continuity through the drive trip switch, in tab switch, lane 25A switch transferred, and sign of crossfooter "A" switch to energize the solenoid, release the interlock and permit the drive to trip. However, when the condition of the condition of the crossfooter is minus and is to be tested, sign of crossfooter "A" switch is transferred so that continuity must be provided through the minus sensing bail. If the minus pinions are at cipher position, the minus sensing bail switch is closed to complete the solenoid circuit but if there is an amount on the minus pinions, the switch is transferred to prevent energizing the solenoid, thus preventing drive trip. The motor bar release key can then be depressed to partially reset the drive trip. Depression of an alternate motor bar or control key causes the normalizing switch to be transferred providing a circuit to energize the solenoid, release the interlock and permit the drive to trip.

Crossfooter A Non-Clear Lock - Style 3

Crossfooter "A" Non-Clear Lock - Style 3 is a combination of Style 1 and Style 2. This feature can provide different results in different stop positions.

Lane 25B switch is added to the circuit to provide the results of "Crossfooter Non-Clear Lock - Style 1 or Style 2". When a stop position has a pin in lane 25A but does not have a pin in lane 25B, the drive will not trip only when there is a minus amount in the crossfooter (Style 2), because lane 25B switch provides a circuit around the plus bail sensing switch. However, when a stop position has a pin in both lanes 25A and 25B, either a plus or minus amount in the crossfooter will prevent the drive from tripping (Style 1). A pin in lane 25B transfers lane 25B switch so that both the plus sensing bail switch and minus sensing bail switch are in series with the sign of crossfooter "A" switch. Thus, in one stop position the crossfooter can be tested for being clear either plus or minus and in another stop position the crossfooter can be tested for being clear minus only.

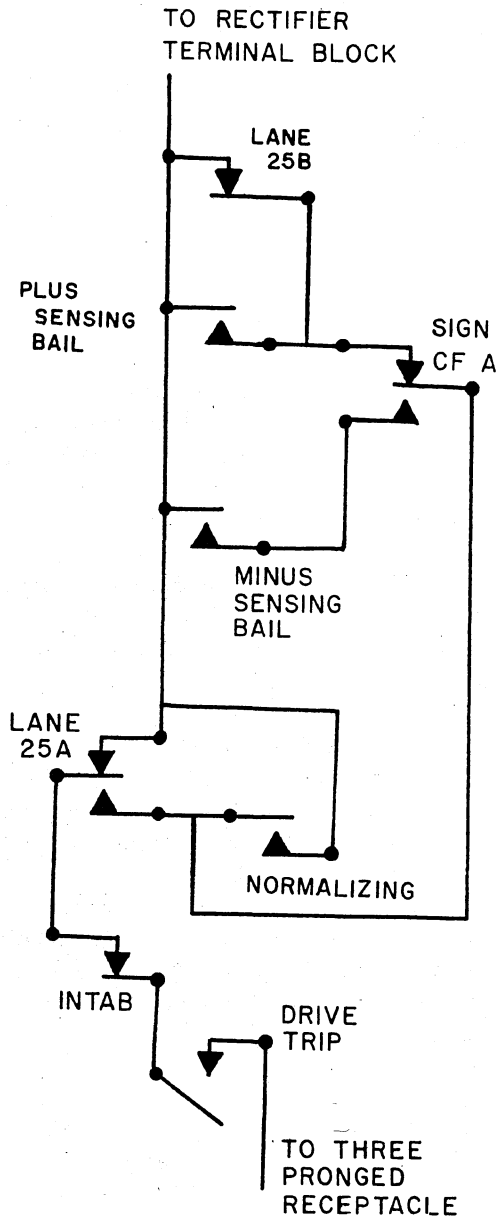


Fig. VII-135

Tests and Adjustments

A15-1 With a control pin active in lane 25A or 25B, actuator(s) AE and AD should move the plungers of switches AF and AG to within .030" to .040" of the switch body to transfer the contacts.

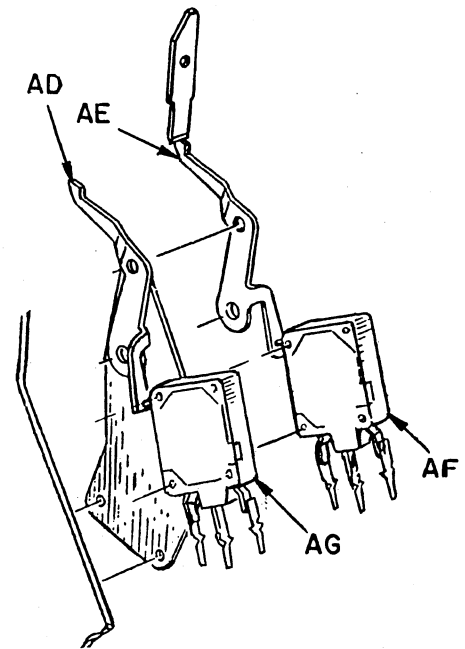


Fig. VII-136

TO ADJUST, bend the lower arm of actuators AE and AD.

REASON: To ensure transferring the contacts and to extend the life of the switch.

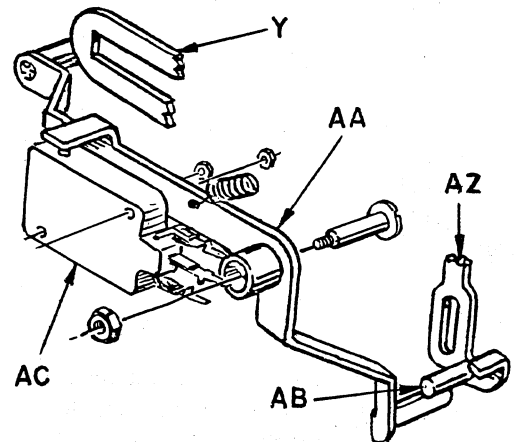


Fig. VII-137

A15-2 With the machine cycled until crossfooter "A" symbol slide Y is in its forward position, there should be .005" to .010" vertical passing clearance between the rear formed ear on actuator AA and stud AB when AZ is lowered to its minus position.

TO ADJUST, bend the rear formed ear on actuator AA.

REASON: To ensure lowering slide AZ during a minus balance.

A15-3 With the rear formed ear on actuator AA limiting against the stud AB the forward formed ear on actuator AA should hold the plunger of minus balance switch AC to within .030" to .040" of the switch body to transfer the contacts.

With AZ in its plus position the plunger on switch AC should not be depressed by front lip of AA.

TO ADJUST, bend forward formed ear of AA as required.

REASON: To retain transfer of contacts when crossfooter is in its minus position and to prevent transfer of contacts in the plus position.

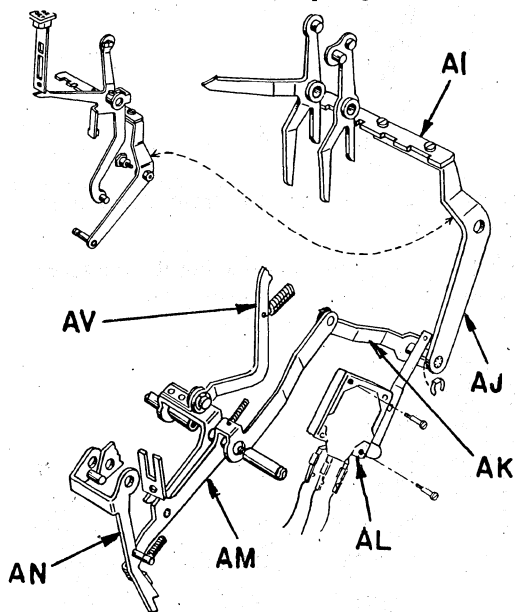


Fig. VII-138

A15-4 With bail AJ rocked from various sources, the actuator of switch AL should move the plunger of the switch to within .030" to .040" of the switch body to transfer the contacts.

TO ADJUST, bend actuator for switch AL.

REASON: To ensure transferring the contacts and extend the life of the switch.

A15-5 With solenoid F de-energized there should be .015" to .020" air gap between clapper B and the core of the solenoid.

TO ADJUST, bend clapper limit on solenoid mounting bracket as required.

REASON: To ensure energizing of solenoid F.

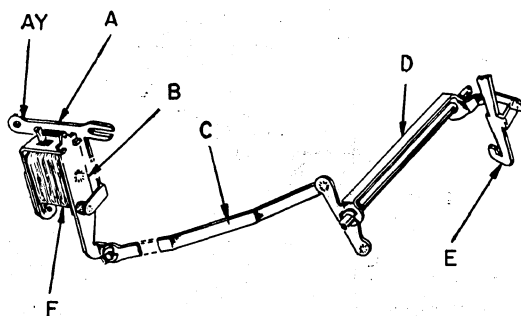


Fig. VII-139

A15-6 With solenoid F de-energized, hook on bail D should have a full hold over but not limit on the ear of drive trip bail E. With clapper B manually held against solenoid core the hook on D should have .015" to .020" clearance over the ear of E.

TO ADJUST, move solenoid bracket AY forward or rearward as required.

REASON: To ensure blocking or permit tripping the drive.

A15-7 With machine cycled to 330° to move drive trip shaft assembly to its overlift position there should be .005" to .015" clearance between actuator J and upper rear corner of switch K, and with trip shaft assembly normal solenoid F should be de-energized.

TO ADJUST, bend actuator J as required.

REASON: To ensure de-energizing the solenoid when the machine is normal, and to prevent a bind of actuator J against body of switch when drive trip shaft assembly is in its overlift position.

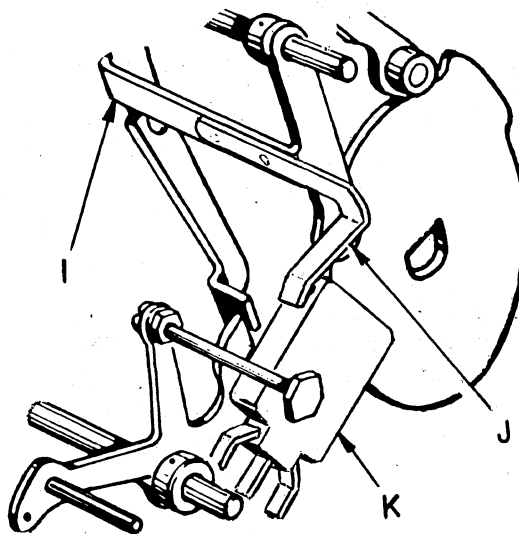


Fig. VII-140

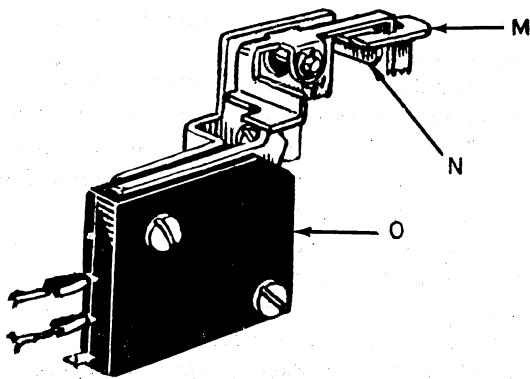


Fig. VII-141

A15-8 With stop bumpers at normal there should be clearance not to exceed .010" between L and M.

TO ADJUST, loosen screws in switch mounting bracket and reposition bracket. If necessary, bend L as required.

REASON: To prevent transfer of contacts when carriage is in a stop position.

A15-9 With a carriage stop dog positioned on a bumper, switch contacts should transfer but switch actuator should not bottom.

TO ADJUST, recheck A15-8.

REASON: To ensure transfer of contacts when carriage is not completely in a stop position.

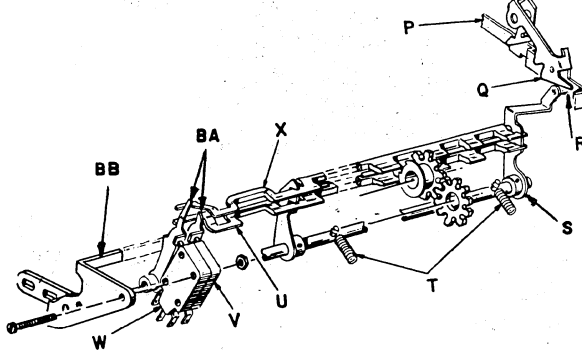


Fig. VII-142

A16-1 With the machine manually cycled to drive timer slide P to its rearward position, latch Q should latch over stud R with full hold. TO ADJUST, weave the forward end of timer slide P to tilt its formed ear forward or rearward. Care should be exercised to maintain full hold of the ear on P with stud R.

REASON: To prevent the projections of sensing

bails U and X from contacting the accumulator pinions as they are rotating.

A16-2 With assembly S in a latched position on latch Q, manually move slide P forward. The stud in slide P should raise the lower edge of the latching surface of latch Q above the center line of stud R.

TO ADJUST, bend the ear on latch Q.

REASON: To permit assembly S to restore to normal against the pinions.

A16-3 With actuators BA held against BB, actuators BA should align with switch plungers and there should be .105" to .110" clearance between switch bodies and BA.

TO ADJUST, reposition switches on mounting bracket.

If necessary bend lips of actuators BA.

REASON: To establish the normal position of BA in relation to the switches.

A16-4 With a plus or minus amount in the cross-footer, there should be .010" to .015" clearance between bails U and X and actuators BA. With machine normal and crossfooter clear, plus or minus, the respective switch should be closed. TO ADJUST, move the switch mounting bracket. Bend the ends of bails U and X for individual adjustment.

REASON: To position the switches within operating range of bails U and X which will prevent transfer of contacts with amounts in the cross-footer, and insure transfer of contacts when the crossfooter is clear.

A16-5 With the motor bar release key in position 2-B depressed, the step of latch bail AN should be positioned over the formed ear of lever AM. TO ADJUST, tip the formed ear of lever AM. REASON: To ensure retaining lever AM in its indexed position.

A16-6 With lever AM held indexed by latch AN, the plunger of normalizing switch AL should be held to within .030" to .040" of the switch body to transfer contacts.

TO ADJUST, weave link AK at its offset.

REASON: To ensure transferring contacts and extend the life of the switch.

A16-7 With the motor bar release key in position 2-B depressed, link AV should return drive trip shaft I to its normal position.

TO ADJUST, weave link AV at its offset.

REASON: To ensure reset of drive trip shaft I.

ROTARY DIAL CALENDAR FEATURE MECHANISMS

The Rotary Dial Calendar Feature, located to the left of the keyboard, provides increased keyboard capacity for indexing amounts. When the rotary dials are turned, the month, day, or year which is indexed to print is visible through the cutouts in the top plate of the keyboard. The Rotary Dial Calendar Feature is also used with the advancing month and year control mechanism to provide a means of automatically advancing the month and year date, indexed from carriage controls.

CALENDAR FEATURE - ROTARY DIAL INDEXED

The rotary dials A, B and C are held in their indexed position by individual detents and star wheels. The rotary dials may be locked in indexed position by shifting lever N to the right, camming slide O forward, positioning the upper projections on slide O over the formed ears of the individual detents, holding them engaged with the star wheels.

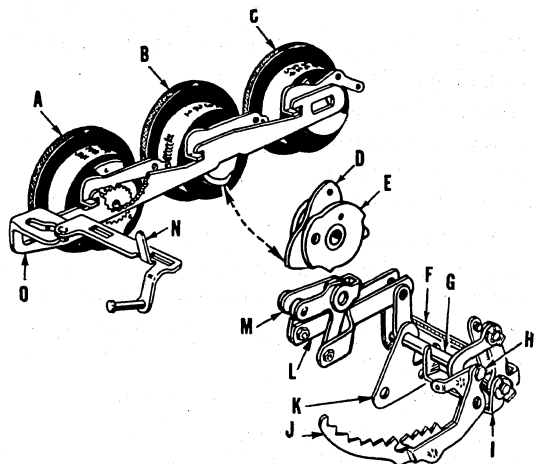


Fig. VII-143

Each of the dials A, B or C index their respective index racks in a similar manner; i.e., when dial B is rotated, cam D is turned, and due to the shape of the cam, bellcrank M is actuated and positions index rack J through linkage L and bail F. When the calendar feature racks move forward, to limit on the steps of the index racks, the type bars are raised to printing positions through the cluster gear unit. Type in the calendar feature magazine is arranged to coincide with

the steps on the index racks positioned by the dials A, B or C.

When dials A and C are rotated to "blank" position the rearmost step of the index racks is positioned so the formed ear on the month and year calendar rack will be limited, thereby preventing forward movement of the racks.

Dial B differs from A and C only insofar as it turns two cams D and E which actuates two linkages, bails, and index racks in order to index the units and tens of days from rotation of one dial. The units and tens of days type bars contain dummy type in positions coinciding with the steps on the index racks that are positioned when dial B is rotated to "blank" position.

Bracket I contains a forked projection to stabilize and hold shaft G parallel to the shaft through index racks J. The hole in bracket K for shaft G is enlarged to prevent destroying the parallel alignment of shaft G when bracket K is tightened to the sideframe.

Tests and Adjustments

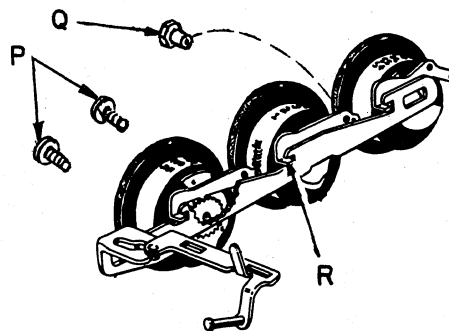


Fig. VII-144

K18-1 Letters and figures on the month, day and year rotary dials should align with the keyboard windows.

TO ADJUST, loosen screws P and locate dials as required.

REASON: To provide easy reading of the month, day or year indexed.

K18-2 Month Dial: Rotate the month dial (blank through Dec.) and manually operate the machine to visually determine which step of month index rack U has the least amount of clearance with the formed ear of rack T. There should be no less than .005" and no more than .010" clearance between the step with the least amount of clearance and the formed ear of rack T.

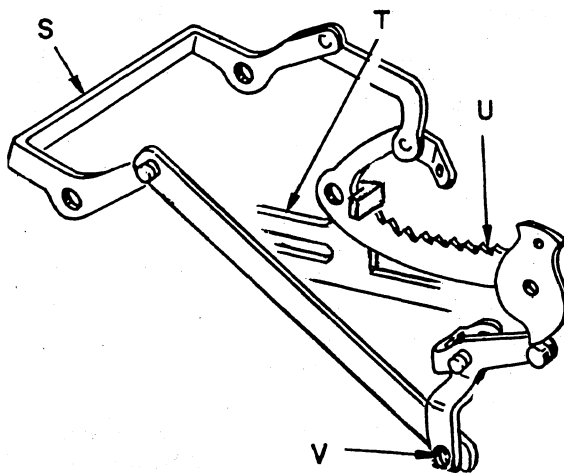


Fig. VII-145

TO ADJUST, turn eccentric V as required. If more adjustment is necessary, weave bail S.
 REASON: To ensure printing the month indexed.
 NOTE: Check for no less than a .035" hold on all steps of the index rack.
 NOTE: Eccentric Q in detent R for the day dial should be set with high side up.

K18-3 Day Dial: Rotate the day dial (blank through No. 10) and manually operate the machine to visually determine which step of unit of days index rack X has the least amount of clearance with the formed ear of rack Y. There should be no less than .005" and no more than .010" clearance between the step with the least amount of clearance and the formed ear on the rack.

TO ADJUST,

A. Rotate the day dial to the No. 1 and No. 31 position and equalize the hold of the formed ear of rack Y on these two steps of unit of day index rack X by turning eccentric Q in detent R.

B. Turn eccentric Z as required. If more adjustment is necessary weave bail W. Recheck figures on day dial to align with keyboard window.

REASON: To ensure printing the unit of day indexed.

NOTE: Check for no less than a .035" hold on all steps of the index rack.

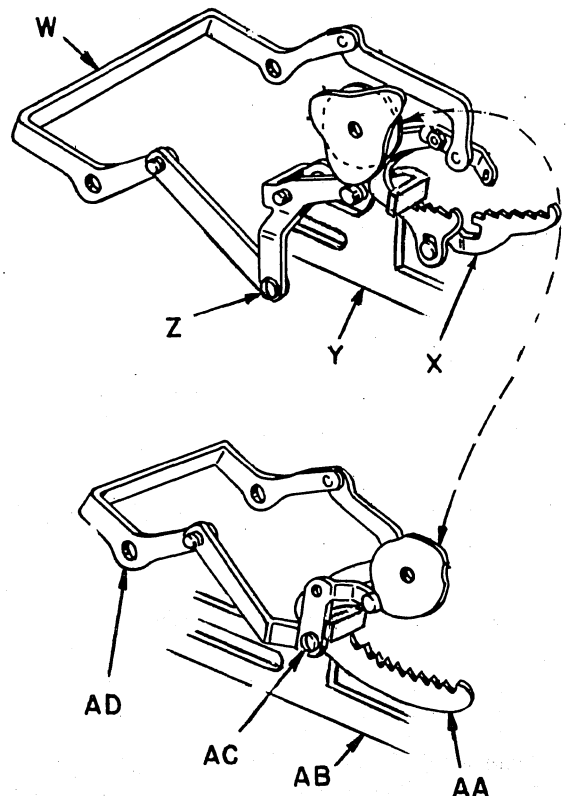


Fig. VII-146

K18-4 Rotate the day dial to No. 10, No. 20 and No. 30 position and manually operate the machine to visually determine which step of tens of day index rack AA has the least amount of clearance with the formed ear of rack AB. There should be no less than .005" and no more than .010" clearance between the step with the least amount of clearance and the formed ear of the rack.

REASON: To ensure at least a 3/4 hold of the stud in the add slide when the add key is used.

TO ADJUST, turn eccentric AC as required. If more adjustment is necessary weave bail AD.

REASON: To ensure printing the tens of day indexed.

NOTE: Check for no less than .035" hold on all steps of the index rack.

K18-5 Year Dial: Rotate the year dial (blank through present year dates) and manually operate the machine to visually determine which step of index rack AF has the least amount of clearance with the formed ear of rack AG.

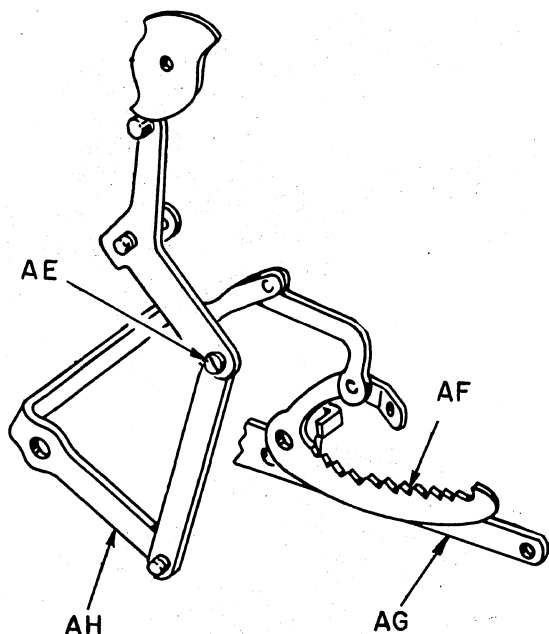


Fig. VII-147

There should be no less than .005" and no more than .010" clearance between the step with the least clearance and the formed ear of rack AG. TO ADJUST, turn eccentric AE as required. If more adjustment is necessary weave bail AH. REASON: To ensure printing the year indexed. NOTE: Check for no less than .035" hold on the steps of the index rack.

K18-6 With the date lever shifted to the right rotary dials should be locked against rotation. With the date lever shifted to the left the rotary dials should be free to rotate.

TO ADJUST, remove only the dials and tip detents R to locate the formed ears as required. (Do not remove dials on F5000).

REASON: To retain the month, day or year indexed.

ROTARY CALENDAR FEATURE WITH ADVANCING MONTH AND YEAR CONTROL, CARRIAGE CONTROLLED LANE 24

This feature automatically advances the month dial of the rotary calendar feature one position on each machine operation when indexed from a No. 4 control pin in lane 24. On machines having balance reducing applications this

mechanism automatically advances the month to print with the new balance of the mortgage, loan, or payment such as the case may be. The year date dial is also advanced when the rotary month dial is advanced from "December" to "January".

In a carriage position having a No. 4 control pin in lane 24 the rotary month dial is automatically advanced one position during the latter portion of the machine cycle. Early in the machine cycle when sensing cam E allows spring C to raise the lane 24 tappet to limit on the No. 4 control pin, bellcrank D shifts slide B to the left to align its cutout with slide H. When actuating shaft G moves forward, lever F latches on the first step of slide B to hold it in its indexed position. The forward movement of the actuating shaft also allows slide H to move forward through spring tension. The forward movement of slide H is limited by the stud, in the extreme rear end, contacting support bracket A. This forward movement of slide H is sufficient to position the formed ear on driver slide K in the path of the roll on cam I, which is the printing control latch cam. As the machine cycle continues, the roll on cam I contacts the formed ear of driver slide K and moves it forward. The forward movement of slide K rocks shaft assembly M through arm L. Rocking of shaft assembly M moves pawl Q rearward; and as pawl Q moves rearward, the tension of spring O causes it to move into active position to advance month dial N through the ratchet wheel. As the month dial is rotated, it positions month index rack Y through cam AA, bellcrank Z, link AC and bail W. When the dial is advanced to "December", the extended arm on bellcrank Z raises pawl R. With pawl R raised, the pocket in its forward end is aligned with the stud in arm P, and when shaft assembly M is rocked the stud in arm P will move pawl R rearward. As pawl R is moved rearward, the closed cam in its rear-most portion cams the pawl into active position to advance the year rotary dial one position. Star wheels AB and S, and their respective detents, hold the rotary dials in indexed position. When the year dial is rotated it positions year index rack X through cam AD, bellcrank T, link U and bail V.

After the roll on cam I has driven slide K forward to actuate shaft assembly M; and continues to rotate, the roll clears the formed ear on slide K allowing slide K and shaft assembly M to

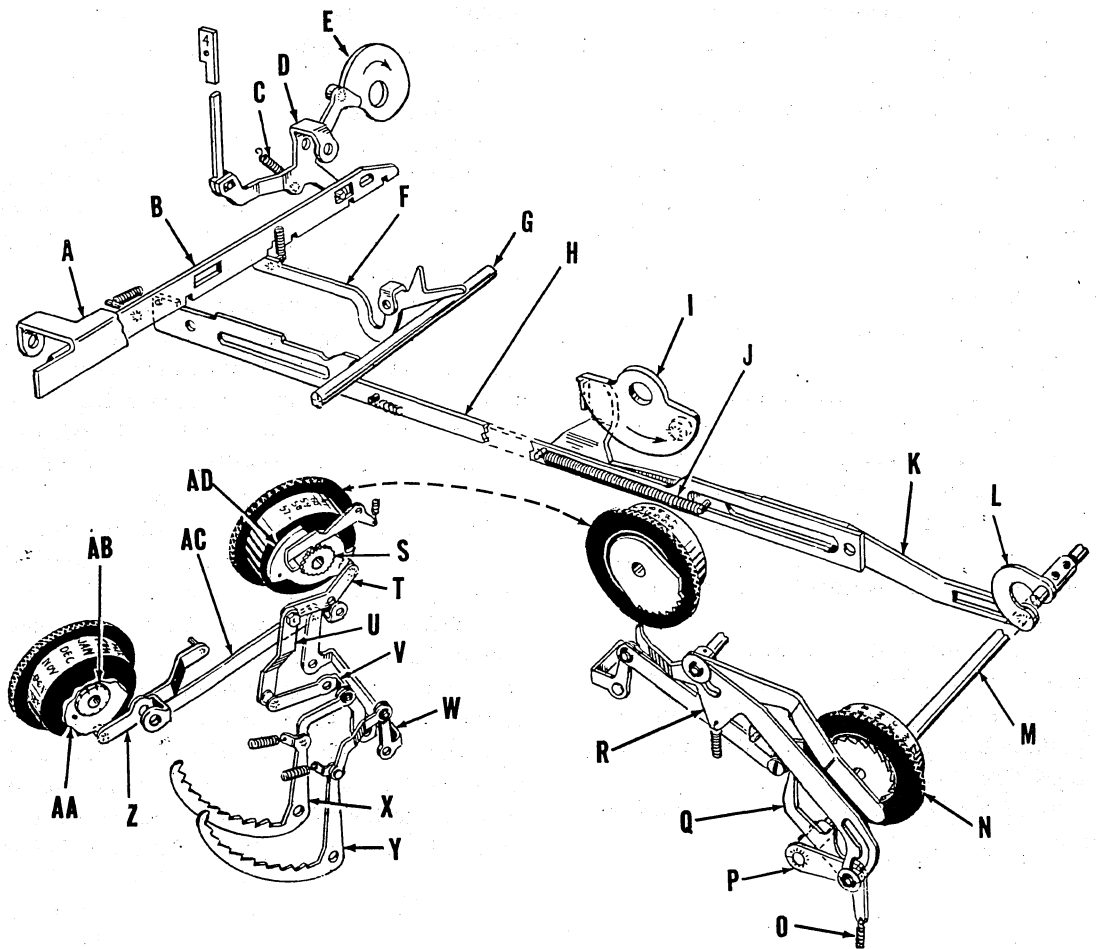


Fig. VII-148

restore to normal through springs J and O.

In carriage positions that do not contain a control pin in lane 24, slide B is shifted a greater distance to the left so the cutout is not aligned with slide H; the cutout not aligned, slide H is blocked. With the slide blocked, the roll on cam I passes in front of the formed ear of driver slide K causing the advancing month control mechanism to remain inactive.

With the carriage controls disabled, slide B remains in its normal position blocking slide H, causing the mechanism to remain inactive.

Tests and Adjustments

1. To ensure proper indexing of the advancing month control slide --

Slide B should be adjusted as follows:

- a. With the carriage controls disabled and the machine operated manually, slide B should block slide H.
- b. With the carriage controls active, a No. 4 control pin in lane 24, and the machine operated manually, slide B should be moved to the left to align its cutout with slide H and lever F should latch on the first step in slide B.
- c. With the carriage controls active, no pin in lane 24, and the machine manually operated, slide B should be moved farther to the left to block slide H and permit latch F to enter the second step in slide B.

To adjust, loosen the screws in bracket A

and reposition. If more movement of slide B is necessary, tip the stud in bellcrank D by bending the arm of the bellcrank.

2. To ensure correct advancing of the rotary month dial --

With a No. 4 control pin active in lane 24, and the machine manually cycled until the roll in cam I gives driver slide K its maximum forward movement; pawl Q should advance the month dial one position and allow the detent to fully engage the pocket of the star wheel without overthrow.

To adjust, loosen bristol set screws on arm P, and adjust the arm for more or less throw.

Note: When making this adjustment the stud in lever L should be held against the rear edge of the slot in slide K.

3. To ensure advancing the year date dial when month dial shifts from "December" to "January" --

With the month dial manually set to "December", the extended arm on bellcrank Z should raise the forward end of pawl R sufficiently to position the pocket of its closed cam in an active position.

To adjust, weave the extended arm on bellcrank Z.

CARRIAGE NON-TABULATE, CARRIAGE CONTROLLED, LANE 19

This feature disables carriage tabulation from a No. 5 control pin in lane 19 with the machine operation indexed from motor bar No. 2. This makes possible the listing of amounts in a selected carriage position with motor bar No. 2 and then using motor bar No. 1 or No. 4 or the crossfooter "A" subtotal key to tabulate to another selected carriage position. To obtain a form space in the stop position where the amounts are listed, a No. 5 pin is placed in lane 13.

With a No. 5 pin in lane 19, tabulation is prevented by hooked lever H being rocked forward through the sensing action of tappet M, lever L and bellcrank K. With the hooked lever H rocked forward, it raises tabulation slide E to inactive position, through bail G and stud I.

With a No. 5 pin in lane 19 the non-tabulate mechanism is disabled and the carriage allowed to tabulate by the depression of motor bars No. 1 or No. 4, which drives links C or D forward. The forward movement of either of these links raises the hooked portion of lever H to an inactive position through lever F, allowing tabulation slide E to remain in active position. The non-tabulate

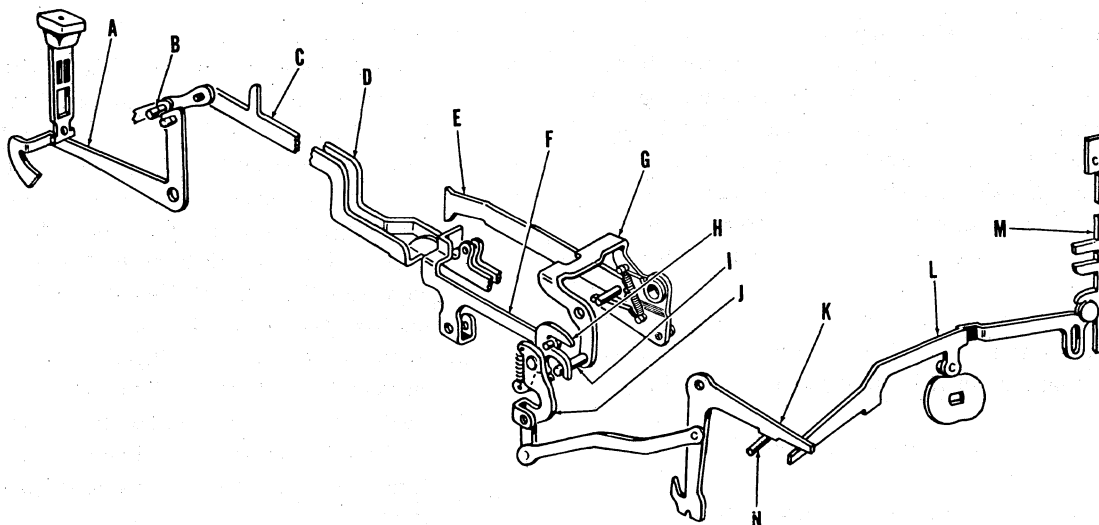


Fig. VII-149

mechanism is depressed. When crossfooter "A" subtotal key is depressed, it rocks bellcrank A, camming motor bar No. 1 linkage C forward, raising the hooked portion of lever H to inactive position through lever F.

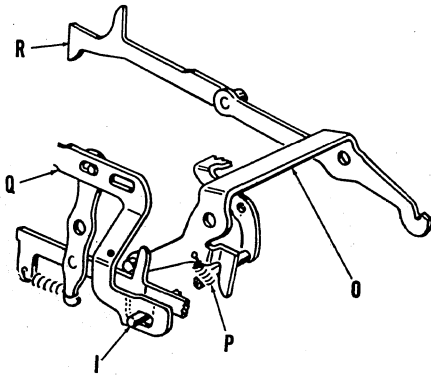


Fig. VII-150

On early machines containing this feature, form spacing was also indexed by the No. 5 pin in lane 19. The early construction of this feature did not have the cutout in the rearmost portion of motor bar No. 3 linkage Q, therefore, when hooked lever H was rocked, it indexed the motor bar No. 3 linkage through the same stud that is attached to bail G.

With the motor bar No. 3 linkage indexed, form space slide R is lowered to active position by the rocking of bail Q by spring P. Motor bar No. 3 link is not cut out as indicated by the dotted lines, to make the feature more flexible. The carriage non-tabulate feature can be active in a carriage position with or without a form space, depending on whether or not a No. 5 pin is placed in lane 13.

Tests and Adjustments

C20-1 When a No. 5 control pin is active in lane 19, manually cycle the machine until bellcrank K receives its maximum throw. Slide E should

be raised to the top of the slot in its guide comb without binding.

TO ADJUST, weave bail G as required.

REASON: To ensure disabling tabulation from a No. 5 control pin in lane 19.

C20-2 With motor bar No. 1, No. 4 or crossfooter "A" subtotal key depressed, manually rock bellcrank K. The lower hook of lever H should be raised so that it will clear over stud I in bail G.

TO ADJUST, bend the formed ear on the forward end of lever F toward or away from the projections on links C and D.

REASON: To permit carriage tabulation indexed from motor bar No. 1, No. 4 or crossfooter "A" subtotal key when a No. 5 control pin is active in lane 19.

SPACE AND RETURN OR TABULATION INDEXED FROM CF "A" SUBTOTAL KEY - IN CONJUNCTION WITH RETURN DISABLING MECHANISM (DR) LANE 20

This feature makes possible the indexing of form spacing, carriage return or tabulation by the CF "A" subtotal key through the motor bar No. 1 linkage. The carriage return disabling mechanism (DR lane 20) provides a means of indexing a carriage return from the CF "A" subtotal key or tabulation from motor bar No. 1 - in the same carriage position.

This feature is used in bank posting applications to enable the operator to make a pre-list of checks on a tape, depress the CF "A" subtotal key to print the subtotal of the checks and tabulate to the "first check" position. The CF "A" subtotal key is used again to print the subtotal of the listed checks and return the carriage to the "old balance" position. During the regular posting operation motor bar No. 1 may be depressed in the "first check" position in conjunction with a No. 5 pin in lane 20 and will index carriage tabulation to the balance position on the ledger or statement.

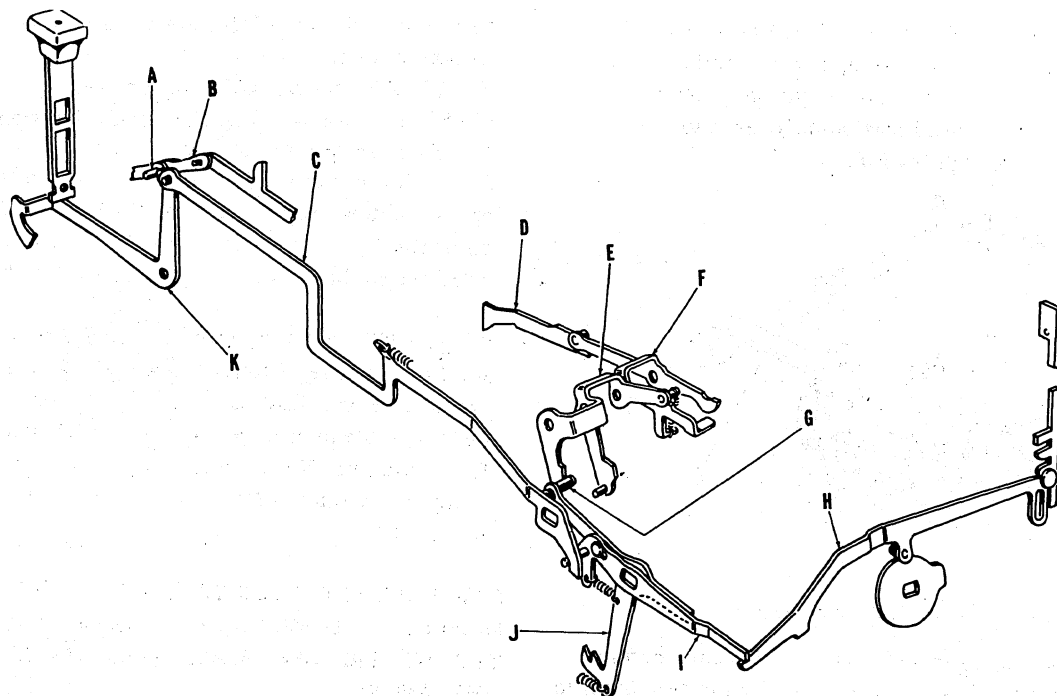


Fig. VII-151

Depression of the CF "A" subtotal key disables the carriage return disabling mechanism (lane 20) through bellcrank K, and slide C, by moving arm I of bellcrank J forward out of the path of lever H. Depression of the CF "A" subtotal key also drives motor bar No. 1 link B forward, through bellcrank K, which indexes the basic functions of motor bar No. 1; form space and carriage return. With the CF "A" subtotal key depressed and a No. 5 pin in lane 15 (DSR), selective tabulation is indexed through lane 1; or lane 3 if the carriage stop position has an index disk with a short projection in lane 3. In the same carriage position, where form space and return is indexed by depression of CF "A" subtotal key, lane 1 or 3 tabulation can be indexed by depression of motor bar No. 1 in conjunction with a No. 5 pin in lane 20. With bar No. 1 depressed, form space and return is indexed, but the sensing action of the lane 20 sensing lever H and bellcrank J raises carriage return control slide D to inactive position, through bails F and E being cammed by roll G.

Tests and Adjustments

NOTE: Adjustment of the Sensimatic Control Unit, Sensing Camshaft and Sensing Bellcranks should be made prior to the following adjustments.

C21-1 With CF "A" subtotal key depressed, there should be .010" to .030" passing clearance between the end of slide I and sensing lever H.

TO ADJUST, bend link C at its offset.

REASON: To ensure disabling lane 20 from depression of CF "A" subtotal key.

C21-2 With a No. 5 control pin active in lane 20 and motor bar No. 1 depressed, manually cycle the machine in its indexed position by the latch plate. Return control slide D should restore to its raised position with a maximum of .005" clearance between slide D and the stud in bail F.

TO ADJUST, turn eccentric screw in roll G.

REASON: To ensure raising the carriage return control slide to its inactive position.

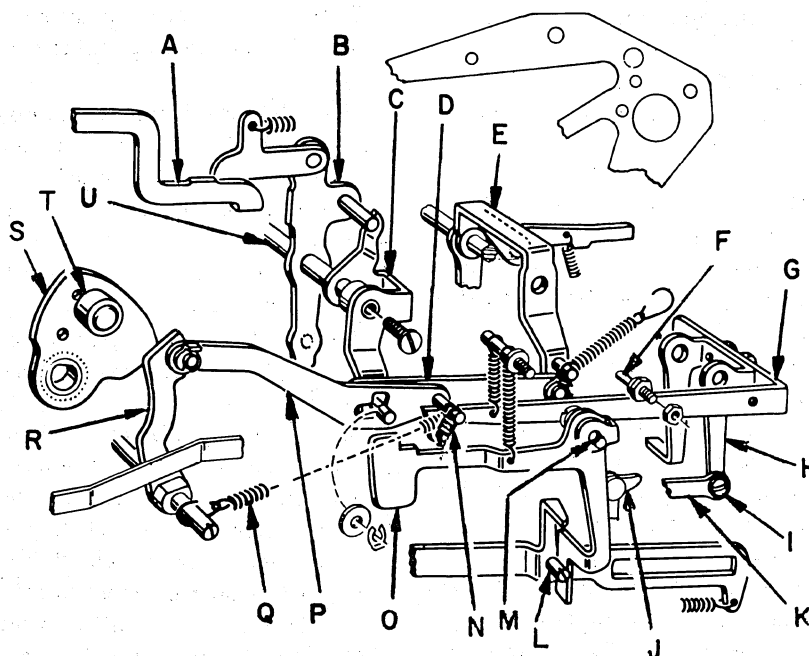


Fig. VII-152

CARRIAGE RETURN OR LANE 3 TABULATION INDEXED BY MINUS SIGN OF CROSSFOOTER "A"

This mechanism in conjunction with the Net Proof Mechanism provides a means of tabulating or returning the carriage to one carriage position when crossfooter "A" is plus and of tabulating or returning the carriage to an alternate carriage position when crossfooter "A" is minus.

INITIAL INDEXING of this mechanism occurs early in the machine cycle when the Net Proof Mechanism rocks bail H during a crossfooter "A" minus total or subtotal operation. Rocking of the bail lowers the forward end of arm G to permit springs N and Q to lower link P, engaging the vertical slot of link P with stud in C.

COMPLETE INDEXING occurs when rotation of printing control cam S moves link P rearward, through roll T and arm R. Rearward movement of link P rocks bail C through the vertical slot of link P and stud in C. Rocking of bail C moves

arm B and motor bar No. 1 linkage A forward, to lower the return slide to active position and normalize the tabulation slide. Forward movement of arm B also disables lane 4 tabulation and lane 5 return and raises the sensing levers in lanes 1, 2 and 3. Rocking of bail C also moves link D rearward to raise lane 3 bellcrank through bail E. Raising of lane 3 bellcrank disables lane 1 tabulation and lane 2 return, thus permitting lane 3 to be indexed.

Latch O, which becomes active when register "C" symbol rack moves forward, is positioned in front of stud in C to hold the mechanism indexed until the proper time during the machine cycle. The latch is released by screw L late in the machine cycle when symbol rack moves rearward, thereby allowing the mechanism to restore to normal.

The elongated slot in the forward end of link K allows a subtract or total operation of the section receiving the net accumulation without indexing carriage return or lane 3 tabulation indexed by minus sign of crossfooter "A".

Tests and Adjustments

NOTE: The "Net Proof" mechanism tests and adjustments should be made prior to the following tests and adjustments.

C16-1 With machine normal manually rock arm R rearward. There should be clearance not to exceed .002" between the top of the horizontal slot in P and the stud in C. Link P must restore freely to its forward position to align its vertical slot with the stud in C.

NOTE: The top rear edge of bails H and G should be parallel.

TO ADJUST, turn eccentric shoulder screw F in auxiliary side frame as required.

REASON: To ensure proper alignment of stud in bail C with horizontal slot in link P.

C16-2 With crossfooter "A" in minus balance position and a No. 5 control pin active in lane 16, pawl J should contact and start to move the formed ear of bail H at 20° to 23° of machine cycle.

TO ADJUST, weave inner arm of bail H as required.

REASON: To ensure indexing accumulator meshing hook for "B" or "C" prior to rearward movement of subtract/total control slide.

C16-3 With crossfooter "A" in minus balance position and a No. 5 control pin active in lane 16, accumulator meshing hook for "B" or "C" should have at least a 3/4 hold on square stud in subtract total control slide.

TO ADJUST, turn eccentric I as required.

REASON: To ensure safe hold of accumulator meshing hook for "B" or "C" over square stud in subtract/total slide.

C16-3A NOTE: When crossfooter "A" is in minus balance condition and a No. 5 pin is active in lane 16, the subtract bellcrank in lane 11 or 17 should latch behind its bellcrank.

TO ADJUST, recheck adjustment C16-2.

REASON: To ensure latching the subtract bellcranks.

C16-4 With crossfooter "A" in minus balance position and a No. 7 control pin active in lane 16, arm G should be low enough sufficiently to permit the vertical slot of link P to engage the stud in bail C and meshing hook in the receiving accumulator should locate in non-add position.

TO ADJUST, recheck C16-3.

REASON: To ensure indexing a carriage return or lane (3) tabulation and to non-add the receiving accumulator.

C16-4A With crossfooter "A" in minus balance position and a control pin active in lane 16, manually rock bail C to raise the tabulation control slide to the top of its guide comb. During a machine cycle, link P should not provide any additional movement to bail C.

TO ADJUST, weave bail C as required.

REASON: To prevent deflection of post U.

C16-5 With crossfooter "A" in minus balance position and a control pin active in lane 16 cycle machine until step on latch O contacts stud in bail C. There should be no more than .005" clearance between the front edge of the step on latch O and the stud in bail C.

TO ADJUST, turn eccentric screw M as required.

REASON: To ensure retaining carriage return or lane (3) tabulation linkage indexed during a machine operation.

C16-6 With a credit balance in the machine and a pin active in lane 16, cycle the machine.

Latch O should release the stud in bail C at approximately 325° of the machine cycle.

TO ADJUST, bend the formed ear of latch O as required.

REASON: To retain bail C until the latch plates release the bellcranks.

NON-ADD OF ACCUMULATOR "B" FROM DEPRESSION OF CF "A" SUBTOTAL KEY

This mechanism provides a means of taking a manual subtotal of crossfooter "A", in a carriage position where an accumulator "B" add or subtract operation is active, without transferring the amount to accumulator "B".

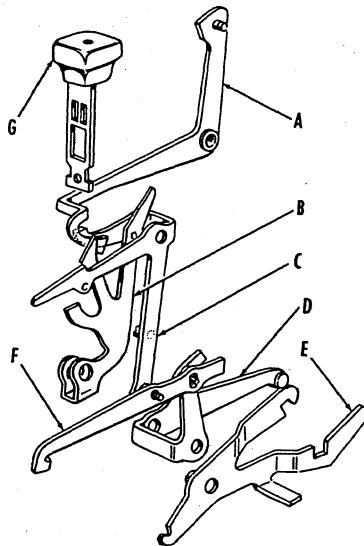


Fig. VII-153

Depression of the crossfooter "A" subtotal key G rocks bellcrank A to lower accumulator "B" meshing hook E to non-add position through lever C, link F and bail D.

Rocking of bellcrank A also swings interlock B rearward to locate the foremost projection of interlock B in the path of the stud in subtract lever C, preventing a subtract operation in accumulator "B" when a crossfooter "A" minus subtotal is taken in a carriage position where the net proof mechanism is active.

Tests and Adjustments

A25-1 With crossfooter "A" subtotal key depressed and latched down, meshing hook E should be in non-add position.

TO ADJUST, tip the formed ear of bellcrank A as required.

REASON: To ensure proper indexing of accumulator "B" non-add from crossfooter "A" subtotal key.

NON-ADD ACCUMULATOR "B" FROM DEPRESSION OF REGISTER "C" ADD KEY

This feature is used in accounting applications where distribution of posted items is desired. As an example, in a carriage position where the posted item is added in accumulator "B", and register "C" is non-added, the operator can add a special item in register "C" and non-add "B" in this same carriage position by depressing the register "C" add key.

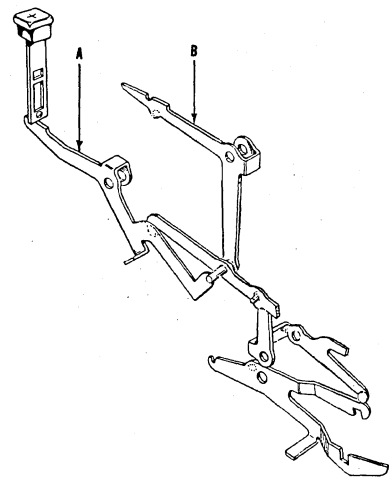


Fig. VII-154

Depression of the register "C" add key rocks bellcrank A, camming the accumulator "B" subtract bellcrank B, which lowers the "B" add hook to non-add position.

CALENDAR FEATURE - ROTARY DIAL INDEXED SERIES F6000

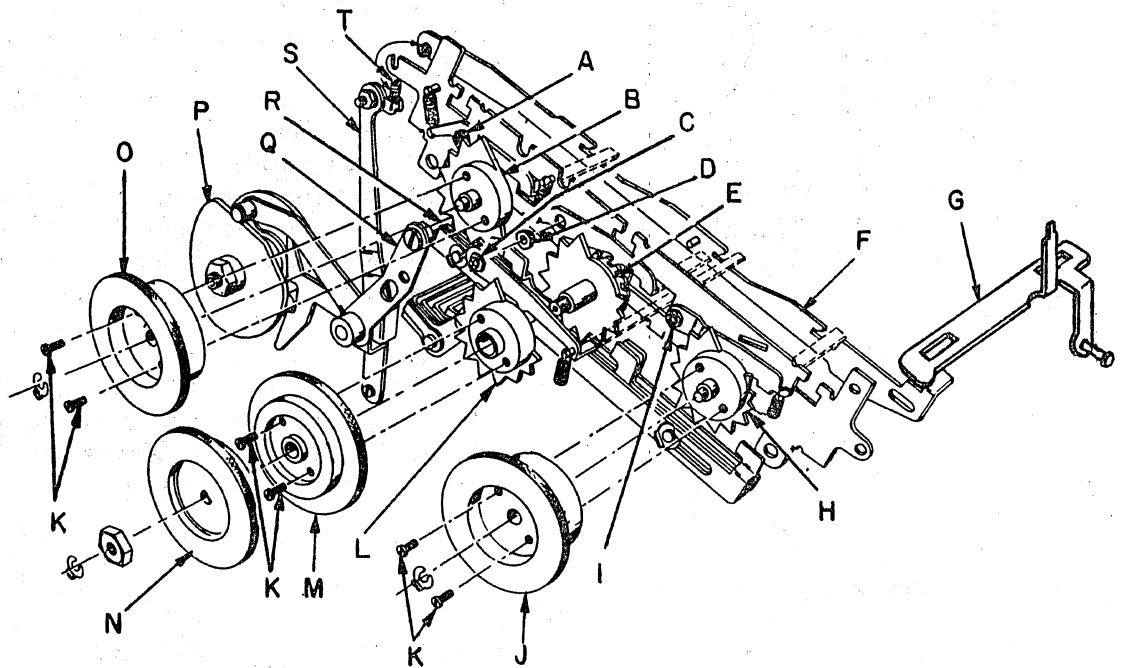


Fig. VII-155

The four rotary dials are located at the left of the keyboard and the month, units of days, tens of days and year indexed to print are visible through plastic windows in a recessed dial cover assembled to the left case panel.

Each dial is attached to a ratchet assembly which is held in its indexed position by an individual detent. The shape of the detents and corresponding cams of the ratchet assemblies permit the dials to be rotated in a rearward direction only.

When the month, units of days, and year dials are rotated to "blank" position, the rear-most steps of the respective index racks are indexed on a machine cycle. The ears of the rack bars are thus limited to prevent forward movement and no printing takes place.

When the tens of days dial is rotated to any

"blank" position, a corresponding step of the index rack is indexed during a machine cycle. The 1, 2 and 3 type are assembled in the lower portion of the type magazine and the inclined camming surface of the type bar is located so that the hammer latch is not actuated until the bar is raised high enough to locate the 1, 2 or 3 type in printing position. Thus no printing takes place when a "blank" is indexed on the dial.

The dials may be locked in indexed position by shifting lever G to the right, camming slide F forward, positioning the upper projections on slide F over the formed ears of the month, units of days, and year detents. A stud in slide F is positioned over the ear of the tens of days detent. Bellcrank S, which is actuated by cam P on the main camshaft, positions slide F through spring T to lock the detents and prevent rotation of the dials during a machine cycle.

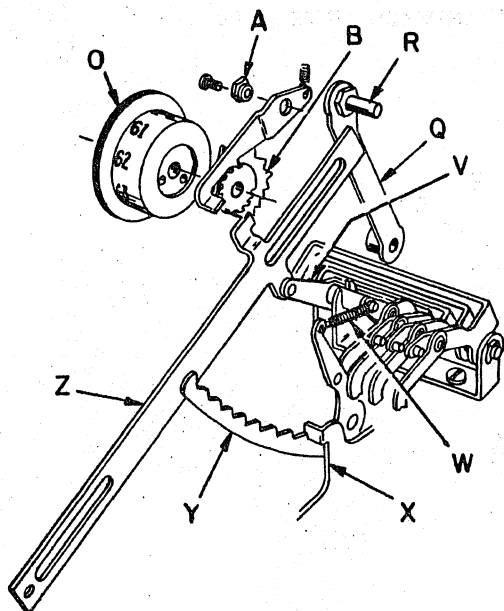


Fig. VII-156

Each of the dials J, M, N, or O select the proper step of the index rack in a similar manner. When dial O is detented in any position, a step of ratchet B is positioned in the path of a projection on index slide Z. During a machine cycle, arm Q moves rearward allowing spring W through ball V to move index slide Z rearward to limit its upper projection against step ratchet B. Spring W also positions index rack Y to limit ear of rack bar X. On the latter part of the machine cycle, arm Q moves forward restoring index slide Z, ball V, and index rack Y.

Tests and Adjustments

NOTE: Tests and Adjustments K18-1-12 and K18-1-1 through K18-1-7 should be performed with the rotary dials removed and the step ratchet assemblies left on machine.

K18-1-12 During a machine cycle, index slides Z, AE, AF, and AI should be free to move completely rearward.

TO ADJUST, remove the left washers AA as required.

REASON: To ensure free movement of index slides.

K18-1-1 During a machine cycle, the projections on index slides Z, AE, AF and AI should limit against, and have a full side hold with the steps on step ratchets B, H, L and E respectively.

NOTE: To provide a safe limit for index slides in their indexed position.

K18-1-2 With the machine normal, and step ratchets B, H, L and E manually rotated, there should be no less than .010" clearance between the longest step on the step ratchets, and the upper rear edge of the projections on index slides Z, AE, AF and AI. Index slides should not bind in their normal position.

TO ADJUST, turn eccentric R as required.

REASON: To prevent the longest step on the step ratchets from contacting the upper rear edge of the projections on index slides.

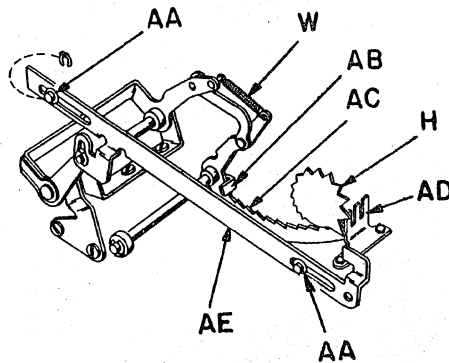


Fig. VII-157

K18-1-3 With the month step ratchet H detented in the shortest step through the second longest step, manually cycle the machine. There should be no less than .005" and no more than .010" clearance between the step with the least amount of clearance on the index rack AC, and the formed ear AB of month calendar rack. Check for no less than a .035" hold on all steps of index rack AC.

TO ADJUST, turn eccentric I as required.

REASON: To ensure printing the month indexed.

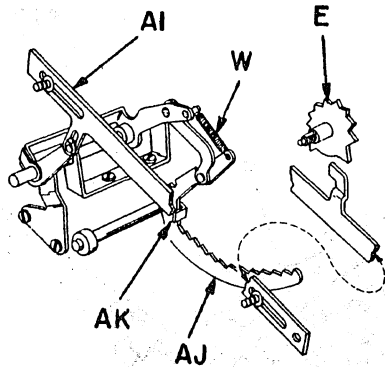


Fig. VII-158

K18-1-4 With the tens of day step ratchet E (inner ratchet) detented in all steps, manually cycle the machine. There should be no less than .005" and no more than .010" clearance between the step with the least amount of clearance on the index rack AJ, and the formed ear AK on rack bar. Check for no less than a .035" hold on all steps of index rack AJ. **TO ADJUST**, turn eccentric D as required. **REASON:** To ensure printing the tens of day indexed.

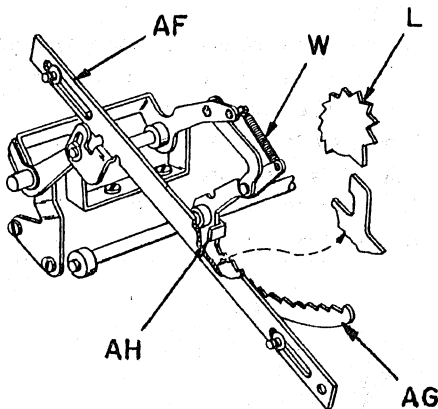


Fig. VII-159

K18-1-5 With the unit of day step ratchet L (outer ratchet) detented in all steps, manually cycle the machine. There should be no less than .005" and no more than .010" clearance between the step with the least amount of clearance on the index rack AG, and formed

ear AH of rack bar. Check for no less than a .035" hold on all steps of index rack AG. **TO ADJUST**, turn eccentric C as required, and recheck K18-1-4.

REASON: To ensure printing the unit of day indexed.

K18-1-6 With the year step ratchet B detented in all steps, manually cycle the machine. There should be no less than .005" and no more than .010" clearance between the step with the least amount of clearance on the index rack Y and the formed ear X of rack bar. Check for no less than a .035" hold on all steps of index rack Y.

TO ADJUST, turn eccentric A as required.

REASON: To ensure printing the year indexed.

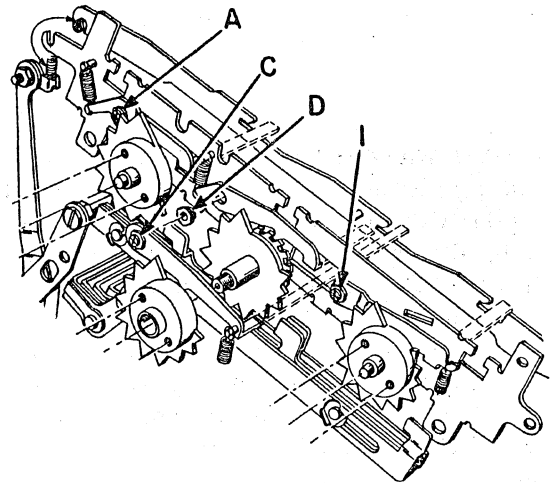


Fig. VII-160

K18-1-7 Rotate the longest step on the month step ratchet H into the path of the projection on index bar AE, and manually cycle the machine. The formed ear AB of month rack bar should clear the forward step on index rack AC, and when limiting against the projection on limit plate AD, the lock stud on month rack bar should be free in the tooth space of the lock plate.

TO ADJUST, bend the projection on limit plate AD as required.

REASON: To ensure free entry of the lock stud into the tooth space of lock plate.

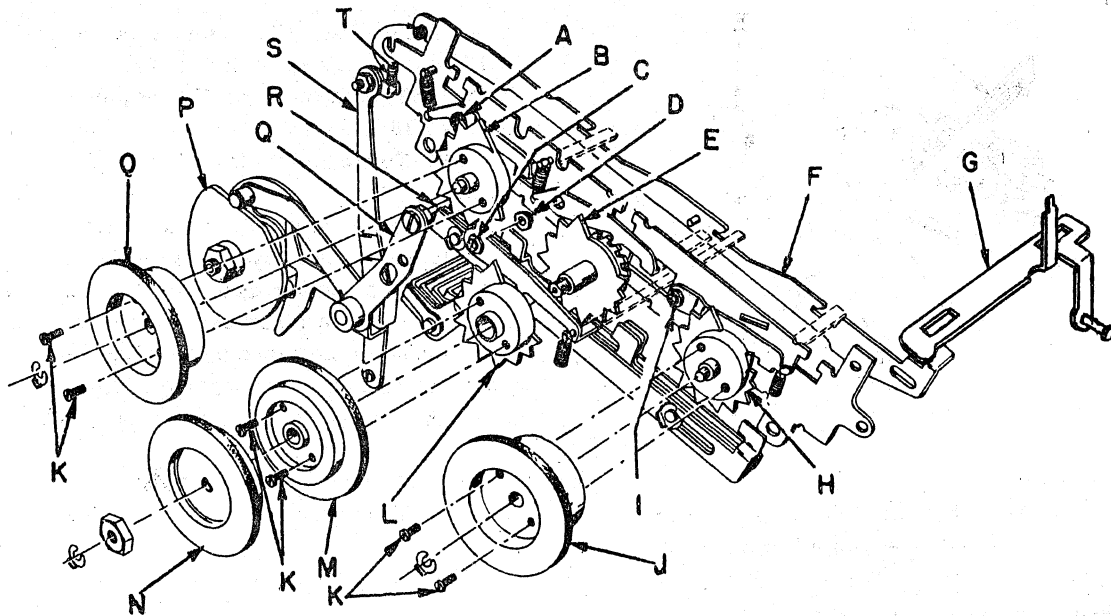


Fig. VII-161

K18-1-8 With date lever G shifted to the right, all step ratchets B, E, H and L should be locked against rotation. With date lever shifted to the left, all step ratchets should be free to rotate.
NOTE: To prevent or permit rotation of the step ratchets.

K18-1-9 Manually cycle the machine to locate the roll of bellcrank S on the high part of cam P. Visually check the forward movement of lock slide F to be approximately the same as the movement provided when date lever G is shifted to the right.

TO ADJUST, bend the arm on bellcrank S as required.

REASON: To prevent rotation of step ratchets during a machine cycle.

K18-1-10 Figures on unit of day dial M should align with figures on tens of day dial N.

TO ADJUST, loosen two screws K in unit of day dial M and locate M as required.

NOTE: If tens of day dial N does not have two access holes to loosen screws K, dial N must be removed to make this adjustment.

REASON: To provide easy reading of day indexed when rotary dial cover AL is assembled to the machine.

K18-1-11 With the left case panel and rotary dial cover AL assembled to the machine;

(a) Figures on the unit and tens of day rotary

dials M and N, should align centrally in the window of rotary dial cover.

(b) Letters and figures on the month and year rotary dials J and O, should align centrally in the windows of rotary dial cover AL.

TO ADJUST,

(a). Remove the case panel, loosen two nuts AM at upper and lower ends of dial cover AL and locate dial cover as required.

(b). Loosen two screws K in dials J and O, and locate the dials as required.

REASON: To provide easy reading of the month, day or year indexed.

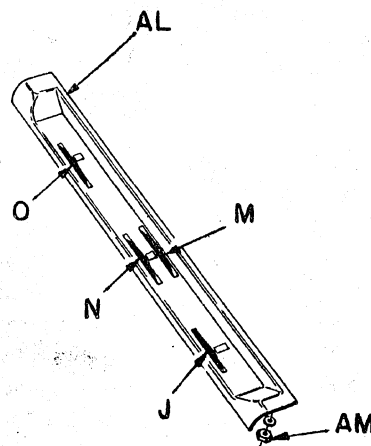


Fig. VII-162

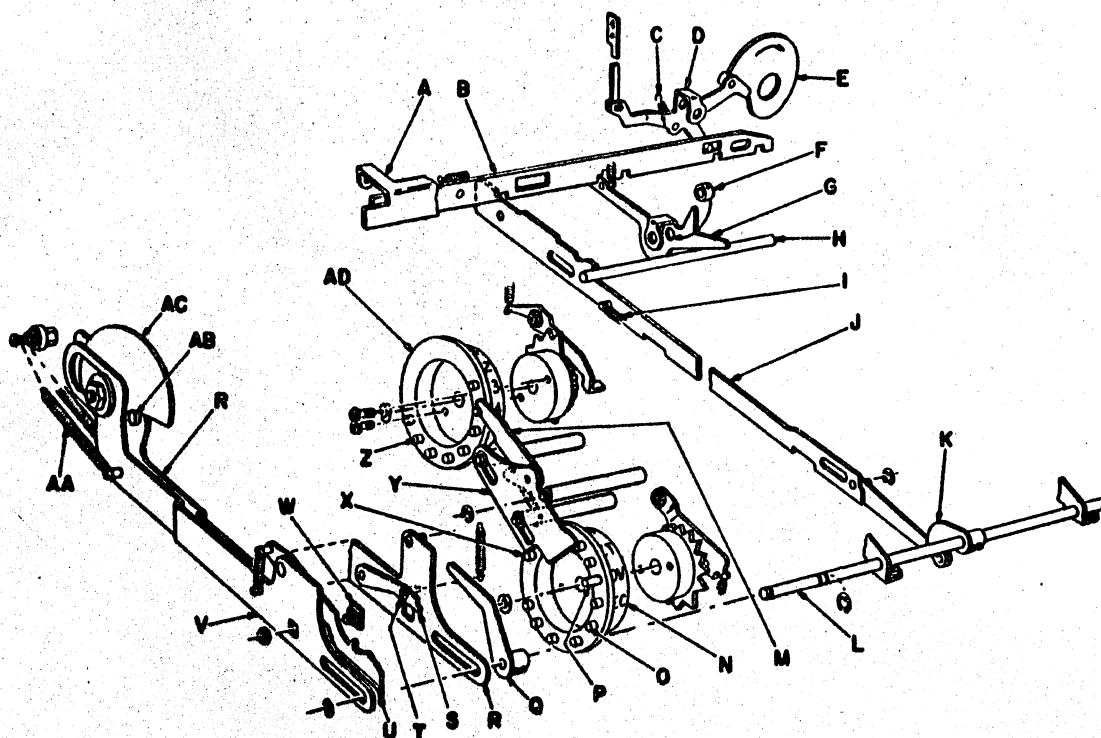


Fig. VII - 163

ROTARY CALENDAR FEATURE WITH ADVANCING MONTH AND YEAR CONTROL, CARRIAGE CONTROLLED LANE 24, SERIES F6000

In a carriage position having a No. 4 control pin in lane 24, the rotary month dial is automatically advanced during the machine cycle. Early in the machine cycle when sensing cam E allows spring C to raise lane 24 tappet to limit on the No. 4 control pin, bell crank D shifts slide B to the left to align its cut out with slide J. When actuating shaft H moves forward lever G latches in the half step of slide B to hold it in indexed position. The forward movement of shaft H allows spring I to move slide J forward rotating shaft L through link K. This rocks arm Q which lowers drive arm S into path of eccentric W.

During the latter portion of the machine cycle cam AC on main camshaft drives slide R forward through roll AB. Drive pawl S contacts

the eccentric W, moving slide V and arm U forward. Drive pawl U engages one of the studs O or stud P in month dial N advancing it one position.

When drive arm U engages stud X, dial N is advanced two positions from December to January. At the same time the long stud P moves slide Y and pawl M rearward advancing year dial AD through one of the studs Z. Slides R and V are restored to normal by springs AA.

In carriage positions that do not contain a control pin in lane 24 slide B is shifted a greater distance to the left so the cutout is not aligned with slide J thus slide J cannot move forward and the advancing mechanism remains inactive. Latch G engages the deep step of the slot in B to retain B in blocking position.

With the carriage controls disabled, slide B remains in its normal position blocking slide J blocking advancing mechanism.

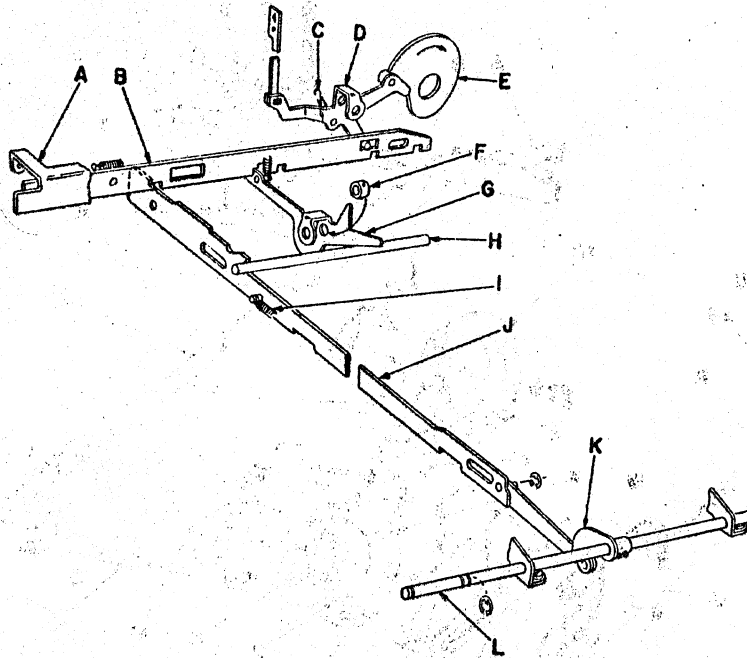


Fig. VII - 164

Tests and Adjustments

Adjustments K18-1-12, K18-1-1, K18-1-2, K18-1-3, K18-1-6, K18-1-7 pertaining to this mechanism appear in Sec. VII - CALENDAR FEATURE ROTARY DIAL INDEXED - SERIES F6000, and should be made prior to the following adjustments.

A14-1 With carriage control lever forward in active position and no control pin in lane 24, cycle machine to approximately 130° . Slide J should have a $3/4$ up and down hold on cross slide B.

TO ADJUST, Bend bracket A up or down as required.

REASON: To ensure blocking slide J when advancing mechanism is not indexed.

A14-2 With carriage control lever forward and a No. 4 control pin active in lane 24, cycle the machine to approximately 130° . Cross slide B should be positioned to align its cut out with slide J.

TO ADJUST, Position bracket A horizontally as required.

REASON: To ensure proper indexing of cross slide B.

A14-1-4 NOTE: With the machine cycled to position actuating shaft H as far rearward as possible from the high point of the two drive cams, there should be no bind between the two projections on detent G, shaft H, and the lock plate spacer.

A14-1-5 (a) With carriage control lever forward and no control pin in lane 24, cycle machine to approximately 130° . With cross slide B indexed, detent G should engage the deep step of the slot in cross slide B.

(b) With carriage control lever forward and a No. 4 control pin active in lane 24, cycle machine to approximately 130° . Detent G should engage the half step of the slot in cross slide B.

TO ADJUST, Loosen screw in collar F and align detent G for freedom. If necessary, recheck test A14-2.

REASON: To prevent premature restoration of slide B and possible release of slide J.

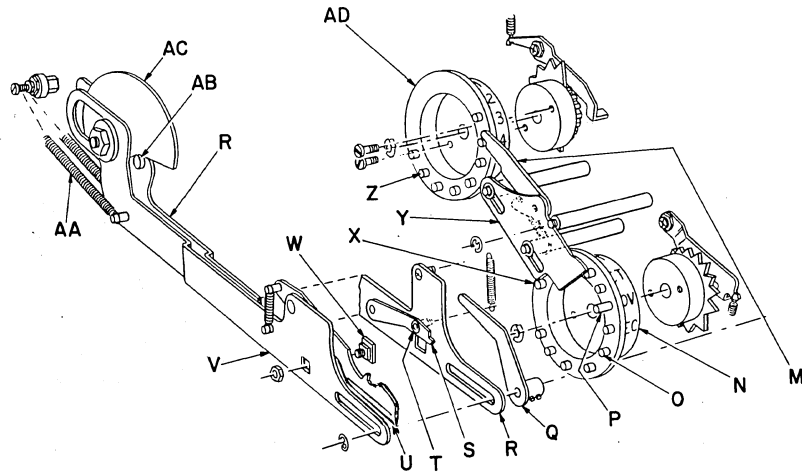
Features

Fig. VII - 165

K18-2-1 With the carriage control lever to the rear, trip the drive and manually cycle the machine until the control slide J limits against cross slide B. There should be .025" to .050" clearance of arm Q on shaft L over stud T in drive pawl S.

With the carriage control lever forward and a No. 4 control pin active in lane 24, trip the drive. Manually cycle the machine to permit slide J to move completely forward; arm Q on shaft L should lower stud T in drive pawl S until the stud T limits against the bottom of the slot in drive slide R.

Drive pawl S should have a 3/4 to a full side hold on eccentric W.

TO ADJUST, Locate arm Q on shaft L as required.

REASON: To permit or prevent advancing the month rotary dial.

K18-2-2 With the carriage control lever forward and a No. 4 control pin active in lane 24, trip the drive. Manually cycle the machine until drive slide R is completely forward. Drive pawl U on slide V should advance the month rotary dial N to the next detented month position with the least amount of overthrow.

TO ADJUST, Remove and relocate eccentric W as required.

REASON: To ensure correct advancement of the month rotary dial.

K18-2-3 During manual rotation of the month rotary dial from December to January, the long stud P in month dial N should move drive pawl M on slide Y sufficiently to advance the year dial AD to the next detented year position.

NOTE: To ensure correct advancement of the year rotary dial.

K18-1-11 With the left case panel and rotary dial cover AE assembled to the machine, letters and figures on the month and year dials N and AD should align centrally in the windows of the rotary dial cover.

TO ADJUST, Remove the case panel, loosen two nuts AF at upper and lower ends of dial cover AE and locate dial cover as required.

REASON: To provide easy reading of the month and year indexed.

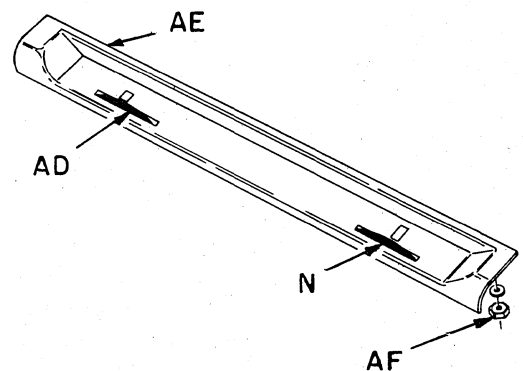


Fig. VII - 166

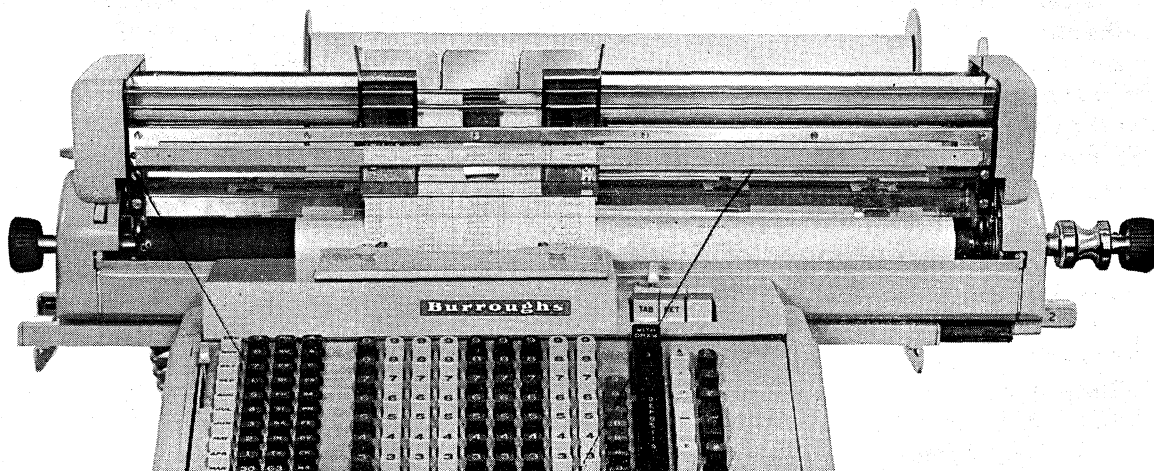
Features✓ AUTOMATIC FORM ALIGNMENT CARRIAGE

Fig. VII-167

The Automatic Form Alignment Carriage (A.F.A.C.) is capable of automatic alignment and ejection of front feed forms and is available in two different styles - Single and Dual. Single is designated 1B and is capable of automatic alignment and ejection of one form. Dual is designated 2B and is capable of automatic alignment and ejection of two forms.

The factory constructed carriage is available for use on all Series E and F machines with the exception of Series F2000, F4000 and striped ledger E2000, but none of the flexibility of the regular carriage is lost.

The form handling assembly consists of form guides equipped with a motorized form transport mechanism under the control of automatic sensing mechanisms. The guides have the ability to drive in, align and eject any form conforming to specification. The motor, drive and other electrical components are housed under the rear carriage cover.

Control of the automatic alignment unit is by an ON/OFF switch at the right end of the carriage, the forward position is ON, rearward OFF. Connection from the carriage to the machine is by a flexible telephone type cable.

Specifications to accommodate form handling:

The left edge of the form may be placed anywhere from the 1/8 inch marking on the lay-

out scale, to the 13-7/8 inch marking of the 18" carriage or the 17-7/8 inch marking of the 22" carriage. Additional deflectors are required for the guidance of the center portion of any front-fed form more than 6 inches wide. Front and rear deflectors are available to control the front and rear sides of the form. These form deflectors are installed between the ASR guide and the ESL guide. The maximum height of a single form is 15 inches and of multiple part forms it is 12 inches. Minimum height is 3 inches when manually aligned or 4-3/4 inches for automatic alignment.

The maximum width of forms is 12 inches and the minimum width is 4 inches. However, when multiple part sets are less than .020 inch thick the maximum width is 12 inches. When multiple part sets are more than .020 inch thick to a maximum of .035 inch thick, the maximum width is 9 inches.

For other specifications pertaining to AFAC, refer to Series F, Instruction and Feature Manual, Form 1009917.

METHOD OF FORM ALIGNMENT

Alignment is by means of two special form guides on Style 1B carriages and four on Style 2B carriages. Each set of guides consists of an Eject Sensor Left (E.S.L.) guide and an Alignment Sensor Right (A.S.R.) guide.

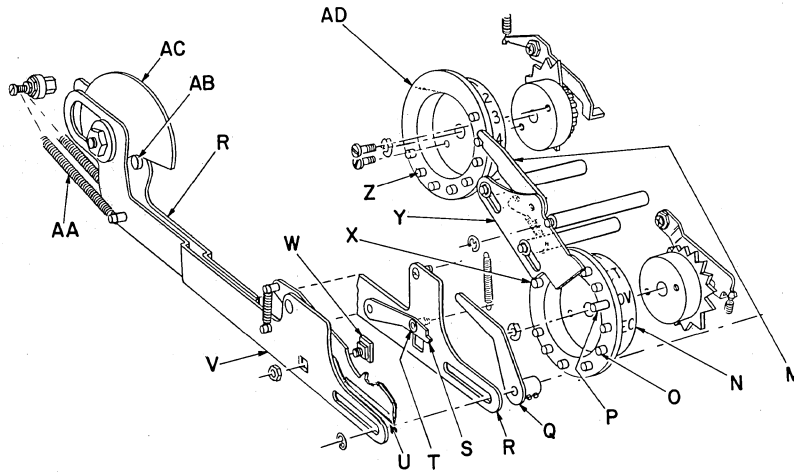
Features

Fig. VII - 165

K18-2-1 With the carriage control lever to the rear, trip the drive and manually cycle the machine until the control slide J limits against cross slide B. There should be .025" to .050" clearance of arm Q on shaft L over stud T in drive pawl S.

With the carriage control lever forward and a No. 4 control pin active in lane 24, trip the drive. Manually cycle the machine to permit slide J to move completely forward: arm Q on shaft L should lower stud T in drive pawl S until the stud T limits against the bottom of the slot in drive slide R.

Drive pawl S should have a 3/4 to a full side hold on eccentric W.

TO ADJUST, Locate arm Q on shaft L as required.

REASON: To permit or prevent advancing the month rotary dial.

K18-2-2 With the carriage control lever forward and a No. 4 control pin active in lane 24, trip the drive. Manually cycle the machine until drive slide R is completely forward. Drive pawl U on slide V should advance the month rotary dial N to the next detented month position with the least amount of overthrow.

TO ADJUST, Remove and relocate eccentric W as required.

REASON: To ensure correct advancement of the month rotary dial.

✓ Changes or additions since last issue.

Printed in U. S. America Revised 2-5-70

K18-2-3 During manual rotation of the month rotary dial from December to January, the long stud P in month dial N should move drive pawl M on slide Y sufficiently to advance the year dial AD to the next detented year position.

NOTE: To ensure correct advancement of the year rotary dial.

K18-1-11 With the left case panel and rotary dial cover AE assembled to the machine, letters and figures on the month and year dials N and AD should align centrally in the windows of the rotary dial cover.

TO ADJUST, Remove the case panel, loosen two nuts AF at upper and lower ends of dial cover AE and locate dial cover as required.

REASON: To provide easy reading of the month and year indexed.

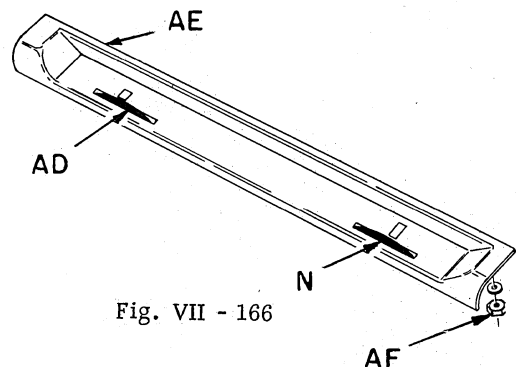


Fig. VII - 166

For Library Binder 21

For Form 3740

Features



Sec. VII

Pages 98 thru 123

RESERVED FOR FUTURE

USE

Pages 97 thru 123 dated 11-15-67 should be removed and discarded, as all information on AFAC is now covered in AFAC Technical Manual.



FeaturesSERIES "60" WINDOW MACHINE SERIAL NUMBERS
ENDING IN S

The series "60" window posting machines with the serial number ending in S are series F6000 machines incorporating features which are described in other parts of this section. These features include Rewind Carriage with Pass Book capabilities, Teller lever with locks, Counter Dials, Lock and Key mechanisms and Lanes 25A and 25B. The circuitry on these machines is different from those with serial number ending in P.

CIRCUIT DESCRIPTION

The following conditions are shown on the diagram (Figure II-216).

S24 (end of page) is shown with a book in the carriage and no end of page indication. S25 (middle of page) is shown with the passbook not at the middle of the page. S26 (Carriage open 2) and S27 (Carriage open 1) are shown with the carriage closed.

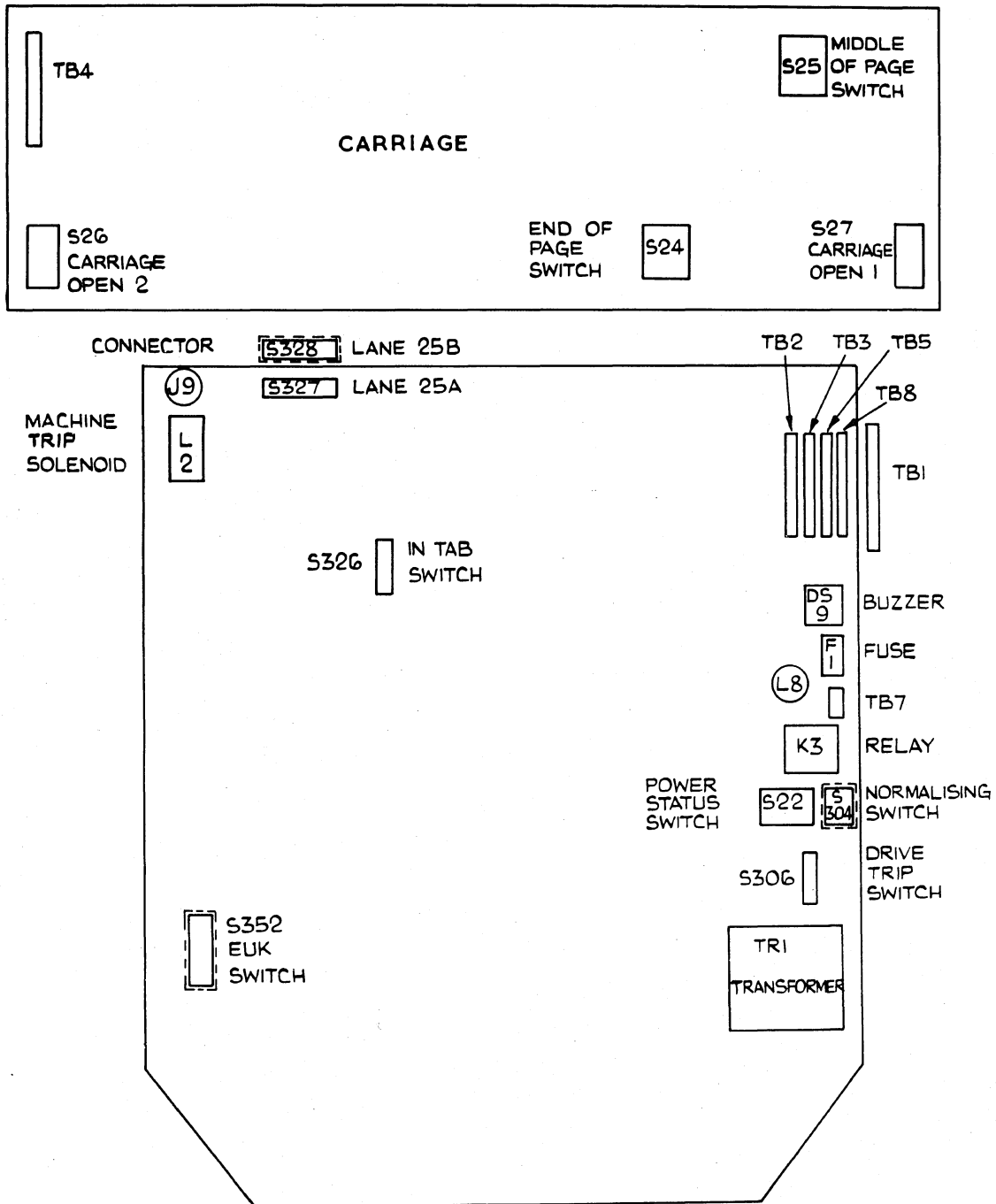
The relay and solenoids are 115V DC. The power to actuate these components is supplied by a full wave bridge rectifier for each component. The resistors R1, R2, R3 and R4 are used only when a voltage higher than 115V nominal is used. The value of these resistors may be determined for the various voltages from the machine schematic. When the Feature, Enforced Use of Keys is used, wiring is as shown by the dotted lines.

Power to all circuitry is controlled by S306 (drive trip) and S326 (in tab). The carriage must be settled in a stop and a drive trip indexed to allow the circuitry to function. With lane 25A not programmed, the machine trip solenoid (L2) is picked through the NC contacts of S327 (Lane 25A) and the rectifier containing CR9, CR10, CR11 and CR12. With Lane 25A programmed, the machine trip solenoid is picked through the NO contacts of S327 (Lane 25A, NO contacts of S25 (middle of page), NC contacts 1 and 2 of K3 and the rectifier containing CR5, CR6, CR7 and CR8. That is; the passbook must not be at the middle of the page (S25) or at the end of the page (S24 and K3) and the carriage must be closed (S27).

When the passbook center fold is at the printing line S25 will normalize, breaking the circuit to L2. The NC contact will establish a circuit through S26 to pick the space solenoid (L8). When the space occurs S25 will again be transferred allowing L2 to be picked and the machine to operate.

The end of page switch (S24) serves a dual purpose, to alert the operator when the passbook spaces above the last posting line and prevent an operation when no pass book is inserted in the carriage and lane 25A is programmed. When S24 is normalized K3 will be picked, NC contacts 1 and 2 will inhibit L2 and normally open contacts 27 and 28 will sound the alarm.

LOGIC SCHEMATIC FOR SERIES "60" WINDOW POSTING MACHINE
WITH SERIAL NUMBERS ENDING IN S

Features

COMPONENT LOCATIONS FOR SERIES "60" WINDOW POSTING MACHINES'
WITH SERIAL NUMBERS ENDING IN S

FeaturesSERIES "60" WINDOW POSTING MACHINECARRIAGE OPEN SWITCH

The carriage open signal switch is located on the left side frame of the carriage. The switch provides a means of electrically maintaining the end of page detection when the carriage is opened.

With the carriage in the closed position, arm D, Fig. VII-218 is in an upward position and lever A will hold switch B (pin in) in a transferred condition. When the carriage is opened, arm D swings downward, moving lever A away from the switch and allows the switch to return to normal (pin out).

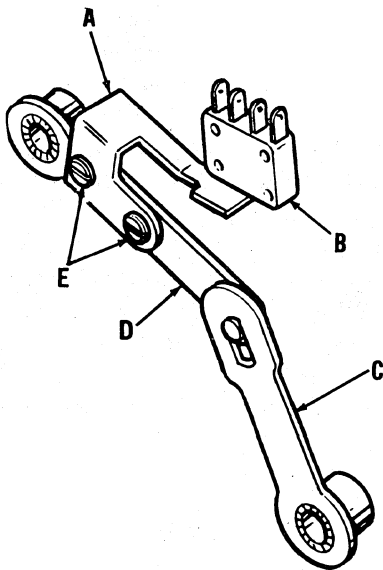


Fig. VII-218

Tests and Adjustments

With the carriage closed and the play in arms C and D, held downward the contacts of switch B should remain transferred.

To Adjust: Loosen screws E and position lever A.

Reason: To ensure transfer of switch contacts.

END OF PAGE SWITCH

The end of page switch is located on the carriage, under the platen. It indicates usage of the last passbook line. When the carriage is open, there will be a gap between contacts A

and B, Fig. VII-219 and when inserted, the passbook will pass between the contacts. When the carriage is closed, the platen will move downward but the passbook will prevent the contacts from completing the circuit. This switch works in conjunction with lane 33. The end of page switch should be located in the center of the passbook.

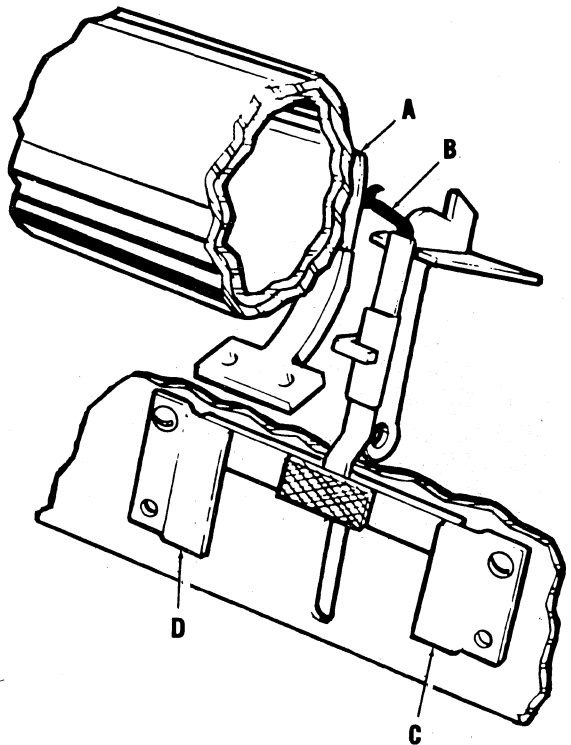


Fig. VII-219

Tests and Adjustments

- A. With the carriage closed, contacts A and B should not complete the circuit when the passbook is at the last printing line. When the passbook is one space past the last printing, line contacts A and B should complete the circuit.
- B. With the carriage open there should be .010" to .020" clearance between contact B and the bottom surface of the ledger pan.

To Adjust:

- A. Loosen screws in brackets C and D and locate contacts B as required.

Features

- B. Bend arm of contact B as required and recheck step A.

Reason: To permit or prevent a machine operation when lane 33 is active and to permit the insertion of a passbook without damaging contacts.

MIDDLE OF PAGE SWITCH

The middle of page switch is located at the rear of the right hand form chute that guides the passbook. This switch prevents printing on the fold of the passbook.

When the passbook is positioned under both switch actuator wires D and E, Fig. VII-220, or with the passbook removed, switch actuator A will hold the contacts of switch F transferred (pin in). When the passbook spaces to the fold, switch actuator wire D drops off the end of the passbook, causing switch actuator A to move away from switch F allowing switch F to return to normal (pin out). Switch F, when normal (pin out) will complete the circuit to the space solenoid thus spacing the passbook. Spacing will continue until switch actuator wire E drops off the end of the passbook and switch actuator A transfers the contacts of switch F. One, two or three spaces can be selected by relocating switch actuator wire E in a different slot of switch actuator A.

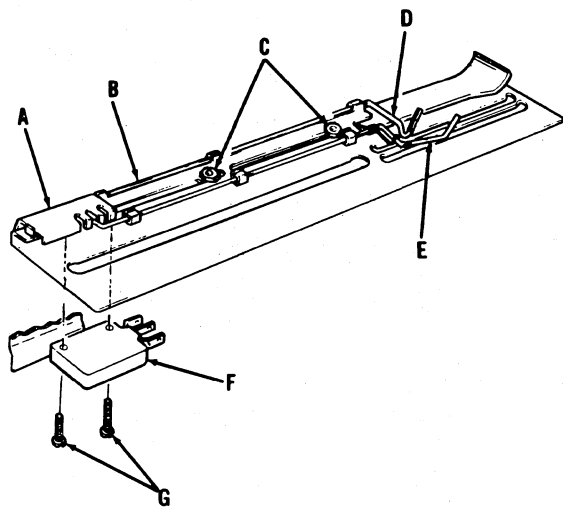


Fig. VII-220

Tests and Adjustments

1. A. With the last page of the passbook positioned under both switch actuator wires D and E, or with the passbook removed, contacts of switch F should be transferred (pin in).
B. With the passbook positioned under switch actuator wire E only, contacts of switch F should be normal (pin out).

To Adjust: Loosen screws G and locate switch F.

Reason:

- A. To prevent automatic spacing.
 - B. To permit automatic spacing.
2. With the passbook spaced one space beyond the last printing line on the top half of the passbook and with the carriage closed, automatic spacing should take place.
To Adjust: Loosen nuts C and locate assembly B so switch actuator wire D has dropped off the end of the passbook.
Reason: To space passbook automatically beyond the middle of the page.
 3. With the passbook spaced one space beyond the last printing line on the top half of the passbook and with the carriage closed, single, double or triple automatic spacing should take place.

To Adjust: Locate switch actuator wire E in guide of actuator A as follows:

- A. Rear slot for single space.
- B. Middle slot for double space.
- C. Front slot for triple space.

Reason: To provide spacing required to space over fold of passbook.

FORM SPACE - MANUAL AND SOLENOID CONTROLLED

Manual spacing of the platen is accomplished by depressing the Space Key located with the other carriage control keys.

Depression of space bar A, Fig. VII-221, causes the formed ear on the bail portion of bar A to contact the cam surface of bail B and rock the formed ear of bail B rearward. The formed ear of bail B will contact stud D on arm C and rock it rearward. The rocking of arm C will index a space operation.

Spacing can also be indexed by solenoid H. When solenoid H is energized; plunger G, thru

Features

wire link F will pull stud E on bail B; thus the formed ear on bail B rocks bail C thru stud D.

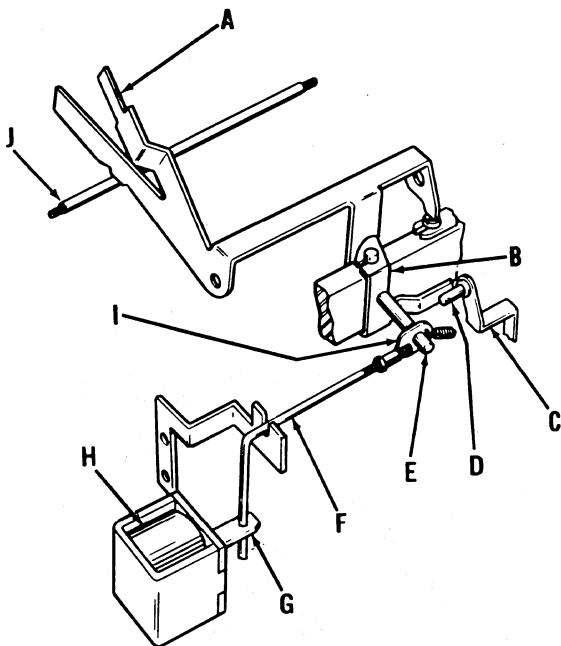


Fig. VII-221

Tests and Adjustments

- A. Manually move bail C rearward until the form space clutch is indexed. With space bar A depressed to limit on shaft J; there should be .020" to .030" overthrow of stud D. Check visually.
- B. With plunger G manually bottomed in the core of solenoid H, the same results should be obtained as in step A.

To Adjust: a. Bend formed ear on bail B.
b. Turn turnbuckle I.

Reason: To ensure form spacing.

JOURNAL REWIND

The Passbook Carriage is equipped with a carriage rewind mechanism and a roll paper cover. Two space mechanisms; one to space the platen and one to space the rewind are furnished. The rewind spacing mechanism is covered in the following text.

As space bail H, Fig. VII-224 moves rearward; the upper portion of arm I moves forward, pulling link J. Link J moves the upper portion of B rearward. The rearward movement of Arm

B, thru yielding spring A, causes space pawl L to rotate gear C. Gear C is fastened to gear O, Fig. VII-225. As gear O rotates, gear M is also rotated thru chain P. The turning of gear M rotates rewind shaft Q, Fig. VII-223. By shifting arm T to the right, shaft Q can be lifted out of the machine.

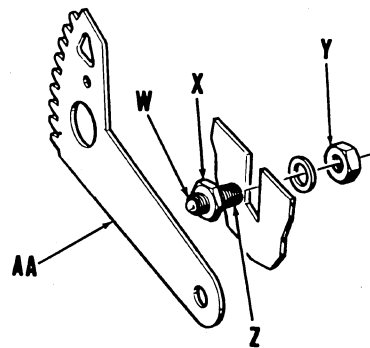


Fig. VII-222 PAPER COVER SECTOR

Tests and Adjustments

1. A. With paper cover partially opened there should be .020" to .030" clearance between the end of the body of ball plunger screw Z and sector AA.
- B. With paper cover fully opened there should be approximately 1/32" clearance between the bottom edge of sector AA and ball W.

To Adjust: Loosen lock nuts X and Y and position ball plunger screw Z.

Reason: To retain paper cover in its open position and to permit ball W, Fig. VII-222, to move under the bottom edge of sector AA.

2. The manual paper rewind twirler Fig. VII-223 should spin freely with rewind shaft Q removed. Gear M also should spin freely.

To Adjust: Position brackets U and R.

Reason: To ensure easy rewind of the journal.

3. There should be a maximum of .010" end play in rewind shaft Q Fig. VII-223.

To Adjust: With lever T in its latched position and held against the step in bracket S, loosen nut AB and position the bottom of lever T.

Features

Reason: To ensure free rotation of rewind shaft Q, Fig. VII-223.

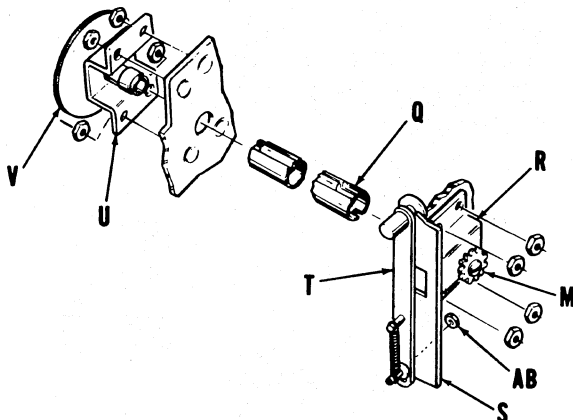


Fig. VII-223 ROLL PAPER REWIND

4. The space bail H, Fig. VII-224, when rocked to its rearward position should advance space ratchet C, through space pawl L, a minimum of five spaces, but not more than six spaces.
To Adjust: Position eccentric G.
Reason: To establish starting position for space pawl L.

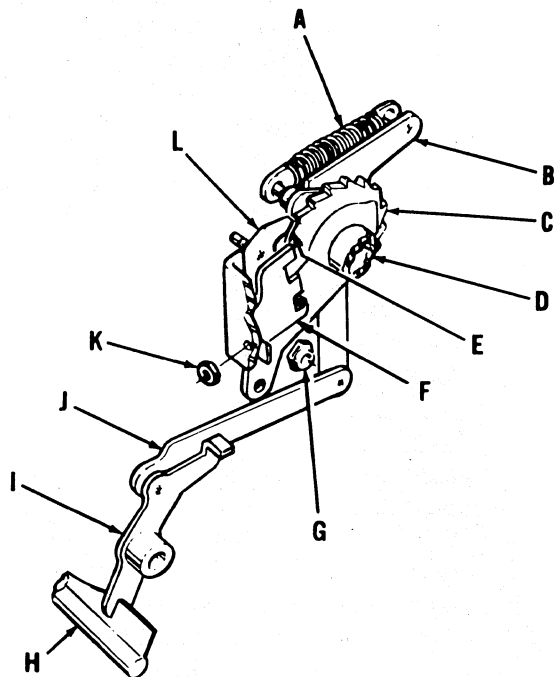


Fig. VII-224

5. A. The space control guide E, Fig. VII-224, should have no more than .010" clearance over the teeth of ratchet C.
B. The driving edge of space pawl L should be flush with the end of space control guide E.

To Adjust:

- A. Weave the curved portion of space control guide E.
- B. Loosen nut K and position space control guide E by moving bracket F.

Reason: To prevent unwinding of paper when cover is opened.

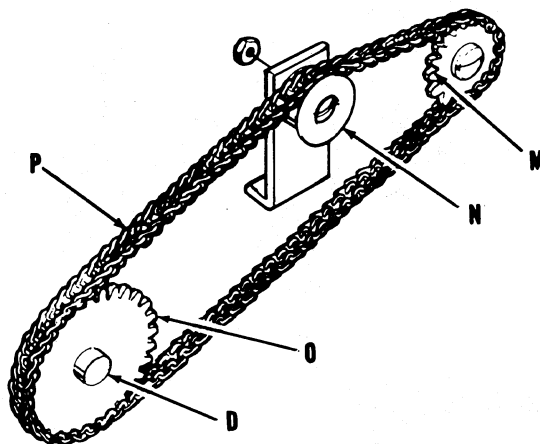


Fig. VII-225 REWIND DRIVE CHAIN

6. Drive chain P, Fig. VII-225, should be loose.
To Adjust: Locate idler N so that there will be 1/16" to 1/8" free sag in drive chain P.
Reason: To prevent unnecessary wear of chain and bearing points.
7. When paper cover AM, Fig. VII-226 is being closed and the steps in the right and left frames AH and AJ just contacting limits AG and AI, the latch of lock AO should engage latch AC.
To Adjust: Bend latch AC.
Reason: To ensure proper latching of cover AM when closed.
8. When paper cover AM, Fig. VII-226, is unlocked, the tension of springs AE and AL should open paper cover AM sufficiently so that it can be manually operated.

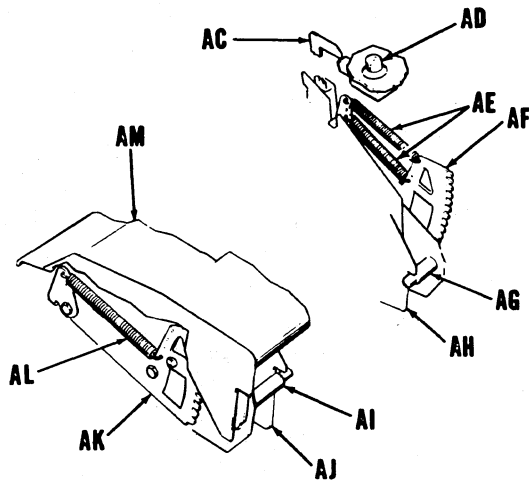
Features

Fig. VII-226 PAPER COVER

To Adjust: Relocate springs AE and AL in holes of sectors AF and AK.

Reason: To retain paper cover AM in its opened position.

NOTE: The two top holes in AK cannot be used.

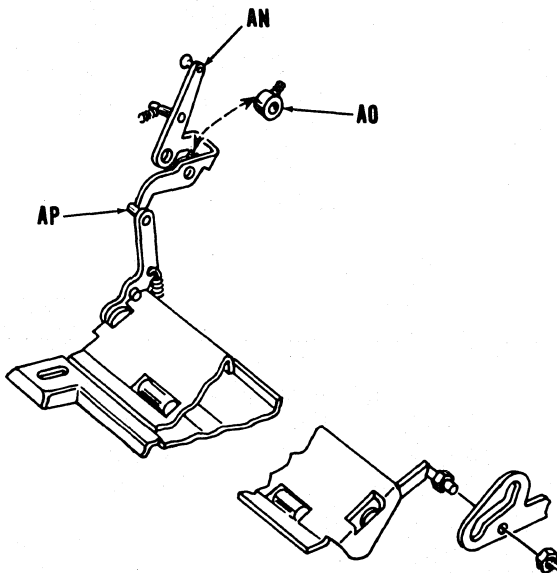


Fig. VII-227 LOWER PRESSURE ROLLS

9. With the carriage open and pressure roll release lever AN, Fig. VII-227 limiting against the head of the screw in collar AO, there should be a minimum of .015" clearance between stud AP and lever AN.

To Adjust: Rotate Collar AO.

Reason: To establish the normal position for lever AN.

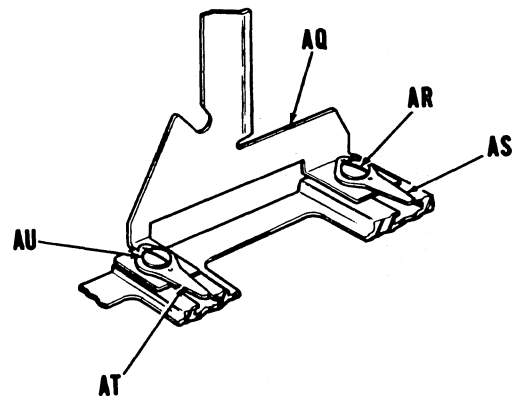


Fig. VII-228 JOURNAL HOLDER

10. With levers AS and AT, Fig. VII-228 of the right and left journal roll holders turned to their horizontal position, the tension of screws AR and AU against levers AS and AT should be sufficient to prevent lateral movement of holders AQ. They should also permit the turning of levers AS and AT to their vertical position.

To Adjust: Turn screws AR and AU.

Reason: To retain journal roll holders AQ in a specified position.

NON-SENSING ELECTRICAL LANE SWITCH

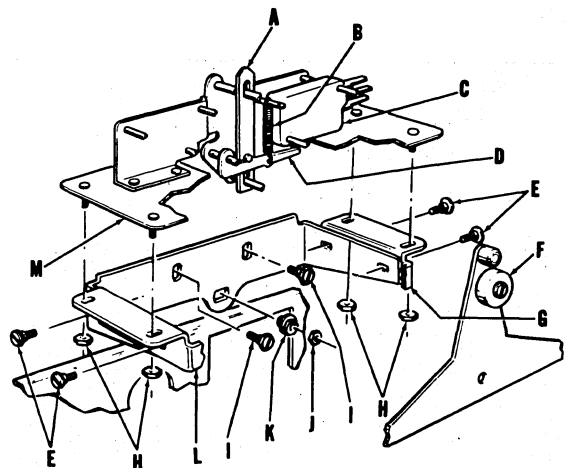


Fig. VII-229

Features

One additional lane of control (lane 33) has been added to the window machine. This lane extends rearward from the 25 mechanical lanes and is used in conjunction with the carriage switches.

The electrical lane switch is held transferred (pin in) by spring B and lever D, Fig. VII-229, an X pin in lane 33 restores the switch to normal (pin out). When a position is programed with a pin, the pin depresses slide A. A stud in slide A lowers lever D allowing return of switch C to normal (pin out) and the circuit is completed through the normal closed contacts.

Tests and Adjustments

1. Switch actuator links A, Fig. VII-229, should be aligned with their respective control pins.
 To Adjust: Loosen four screws E and move bracket L to the front or rear.
 Reason: To ensure the forward and rearward alignment of the control pins and switch actuator links.
2. With the carriage located in a stop position containing electrical lane pins, the pins should align with the points of switch actuator links A. Check all carriage stop positions.
 To Adjust: Loosen four nuts H and position switch bracket M to the right or left for overall alignment.
 Reason: To ensure the correct horizontal alignment of the control pins and switch actuator links.
3. With the carriage located alternately in all stop positions containing electrical lane pins, there should be .050" to .060" clearance between the active switch actuator arm D and the plunger of switch C.
 To Adjust: Loosen two screws I and lock nut J. Rotate eccentric K to raise or lower lane switch assembly, and secure with lock nut.
 Reason: To obtain correct actuation of electrical lane switches from carriage control pins.
 NOTE: The third rail must be loosened or removed and will have to be readjusted to compensate for new location of support roller F.

MACHINE BLOCK SOLENOID

If certain conditions are not satisfied, such as, carriage not in a stop position, end of page switch made, the machine block solenoid will not be picked to trip the drive.

The blocking of the machine operation is accomplished by the machine block solenoid, located at the rear of the left side frame. At home position the forward latch of bail C, Fig. VII-230 prevents machine operation. When solenoid G is energized, clapper F pulls link E rearward, rocking bail C allowing the drive to trip and subsequent machine operation.

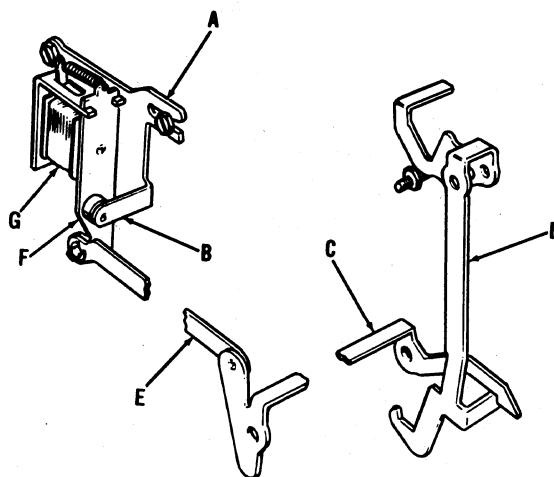


Fig. VII-230

Tests and Adjustments

1. With machine at home position and machine block bail C latched on lower formed ear of latch bail D; there should be .025" to .030" clearance between the latch portion of machine block bail C and the forward side of the lower formed ear on latch bail D.
 To Adjust: Weave the lower formed ear on latch bail D forward or rearward.
 Reason: To prevent motor from running when interlock is active.
2. With the solenoid energized and the clapper contacting the solenoid core, hook on bail C should have .025" clearance above the ear on latch bail D.
 To Adjust: Move solenoid bracket A.
 Reason: To ensure tripping of the drive with the solenoid energized.

Features

3. With solenoid G de-energized, hook on bail C should have 2/3 hold on ear of latch bail D.

To Adjust: Bend clapper limit B on solenoid mounting bracket A.

Reason: To ensure blocking of drive trip and minimum air gap between clapper and solenoid core.

IN-TAB SWITCH

The in-tab switch is mounted on the left side of the gearbox and is operated by lever A, Fig. VII-231, and is rocked by drive trip interlock arm B. Whenever either of the gearbox bumpers are lowered or the bumpers are spread, the in-tab switch is transferred.

Since the lane switch sets up the electrical function, it is necessary that the carriage is fully seated in a stop position before activating the electrical function.

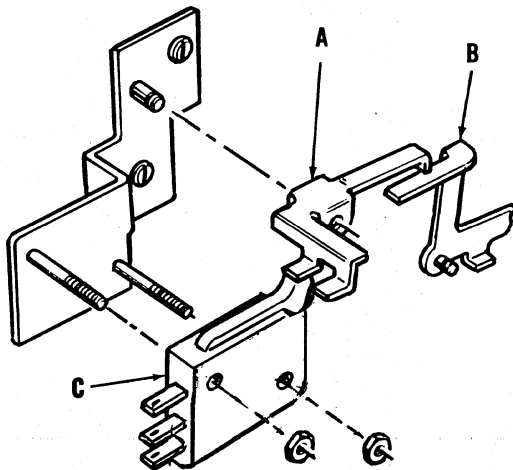


Fig. VII-231

Tests and Adjustments

- A. With stop bumpers at normal, there should be .010" or less clearance between the actuator of switch C and lever A.
- B. With the carriage stop dog position on apex of bumper, the contact should be transferred, but the actuator of switch C should not bottom.

To Adjust: Loosen switch mounting bracket screws and move bracket as required. If necessary, bend forward arm of lever A.

Reason: To prevent transfer of the contacts when the carriage is in a stop position and to ensure transfer of contacts when the carriage is not settled in a stop position.

CIRCUIT DESCRIPTION

With a pin in lane 33, 12 volts will be supplied to the carriage to test switches S23, S24 and S25 when the drive trip switch is closed.

If S24 is closed indicating an end of page, it will activate the alarm and pick the relay to prevent tripping the drive.

If S23 is transferred indicating an open carriage, it will pick the relay to prevent tripping the drive.

If S23 is closed it prepares a path to S25. If the passbook is in the center fold of the passbook S25 will be closed and will energize L8 space solenoid and pick the relay to open the machine trip circuit. When the passbook has spaced over the centerfold S25 will open and the relay contacts will close allowing the machine trip solenoid to trip the drive.

If there is no pin in lane 33 and the motor bar is tripped while the carriage is moving the in-tab switch contacts will be closed and will pick the relay to prevent tripping the drive until the carriage is in a stop position and the in-tab contacts open.

Features

COMPONENTS LOCATIONS FOR SERIES "60" WINDOW POSTING MACHINE

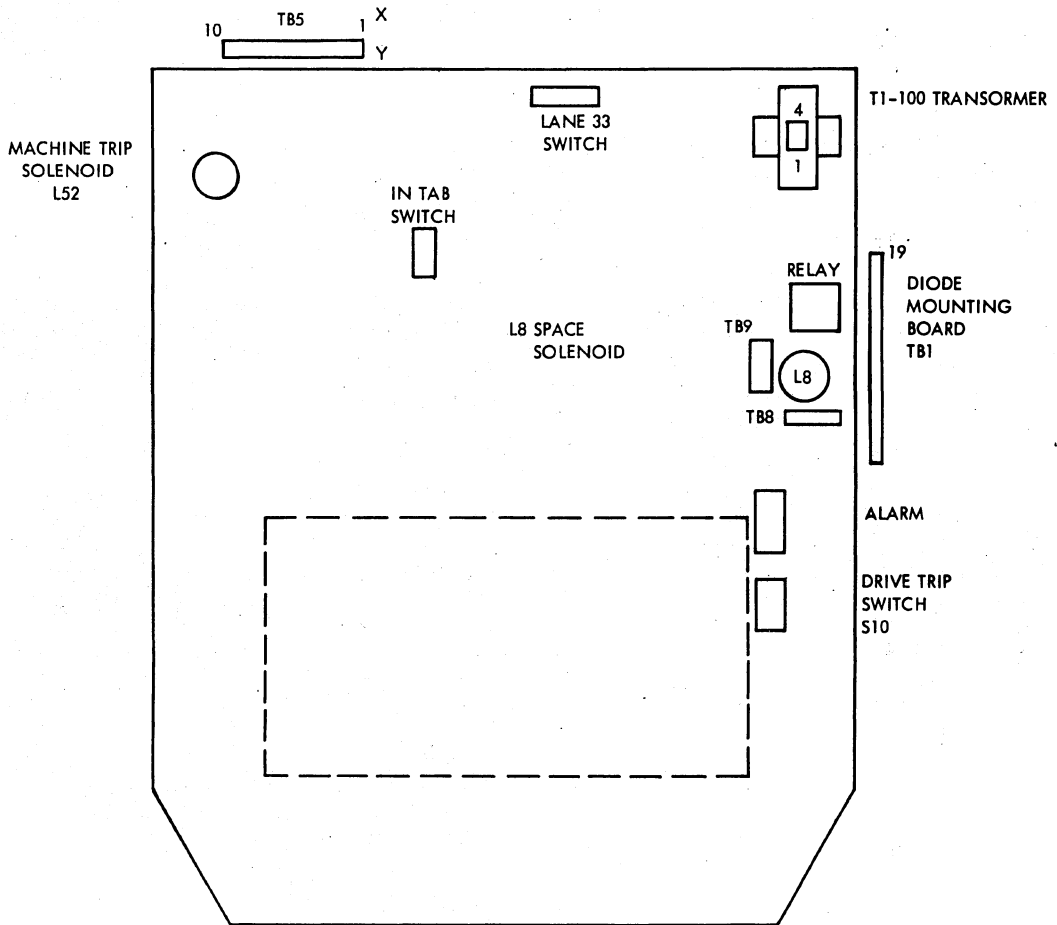


Fig. VII-233

Features

F3050V CUSTOM BUILT UNDER QUOTATION
CF1934 AND CF1730. EQUIPPED WITH OPTICAL
CHARACTER RECOGNITION TYPE (OCR) AND
A570 CHECK DIGIT VERIFIER (CDV) AND REWIND
DEVICES.

(Original machines built for Sears Roebuck)

This system is equipped with optical character recognition type (OCR) and the A570 check digit verifier. The read out for check digit verification is a modulus 10, double, add, double, with check digit in column 1 and numbers to verify in columns 2 through 13. To operate the machine S101 (on-off) switch must be on. Verification is activated by a pin in lane 25A and an account number indexed on the keyboard and a motor bar depressed. S65 closes at 120° - 140° and picks K223 (CDV relay). K223 is held

through S11, J8v, K802, 1 and 2 contacts, J8t and K223, 4 and 5 contacts. K223 contacts 25 and 26 pick L52 (machine block solenoid). S66 closes at 200° - 220° and picks K801 (start verify relay) through K223, 22 and 23 contacts, and 2HH9 resistor and J8w. If the number indexed verifies, K802 (verify) relay picks and transfers contacts 2 and 3 which then drops the hold circuit for K223. If the number indexed does not verify, K802 is not picked thereby allowing K223 to maintain a hold circuit. When motor bar no. 1 or motor bar no. 4 is depressed, K223 hold circuit is broken by S11 which opens the circuit. S67 closes at 250° to 260° and tests the circuit a second time in the event that S66 should fail or that the verifier should fail to verify the number the first time.

COMPONENT LOCATIONS

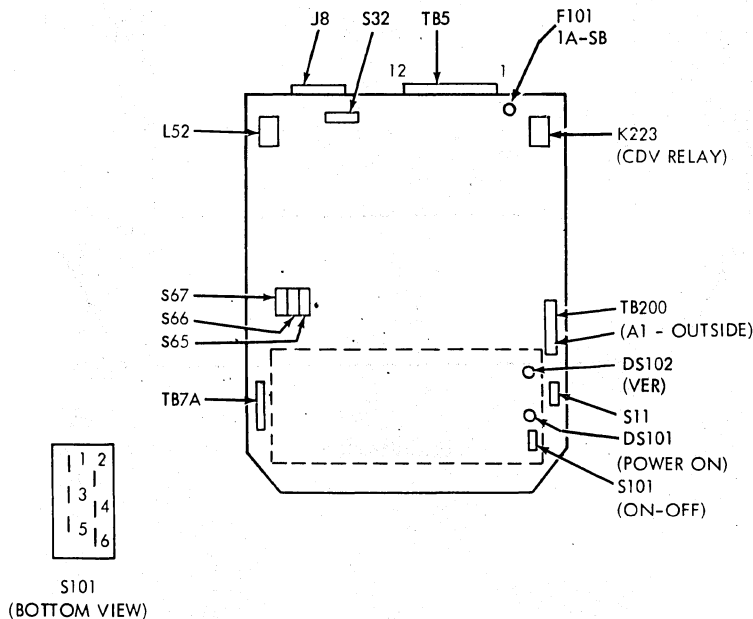


Fig. VII - 234

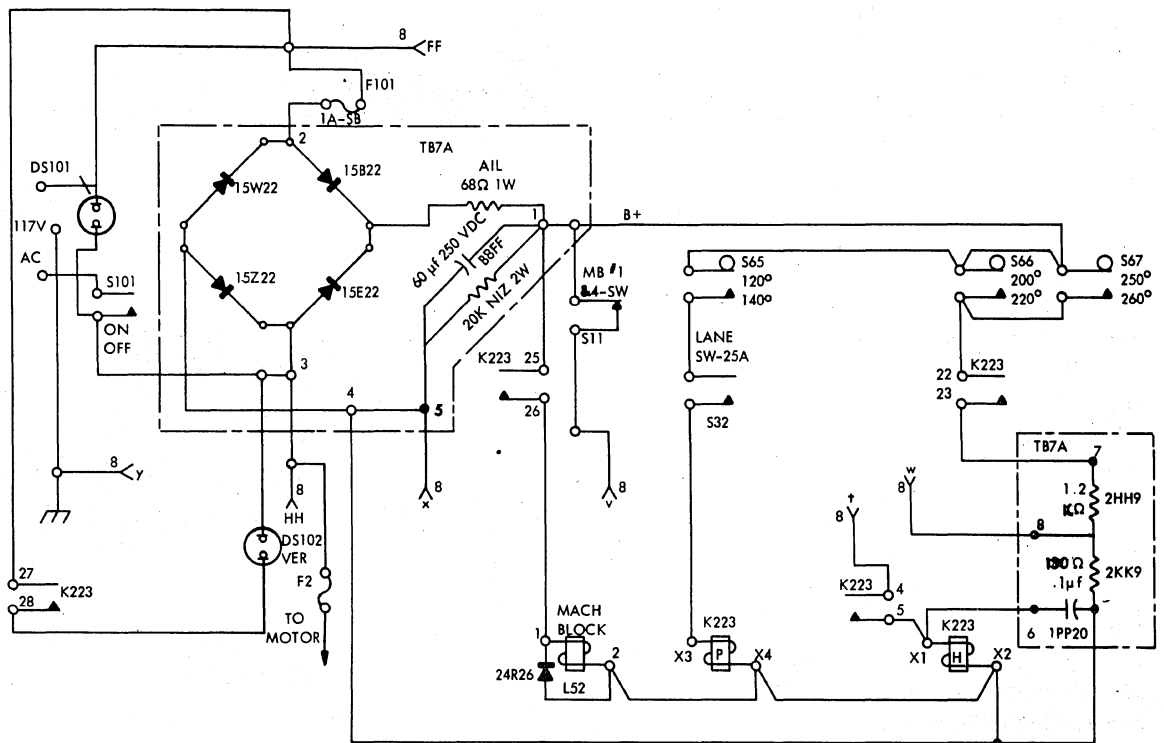


Fig. VII - 235

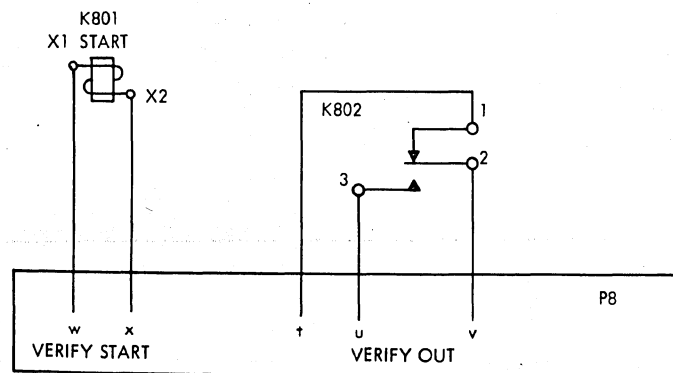


Fig. VII - 236

FeaturesOPTICAL CHARACTER RECOGNITION (OCR)

OCR printing is a method of preparing media for automatic processing by computer systems, thus eliminating the need for keypunching or other data conversion procedures. Optical scanners measure the reflected light and so determine the characters printed on the tape in contrast to light and dark.

The IBM 1285 reads adding machine tapes printed by Burroughs Series F machines equipped with IBM type font type bars, qualified paper and a special inked ribbon. It is very important that all tapes submitted have clear and fully formed characters as well as uniformed inking to be acceptable for scanning.

READABLE CHARACTER FONTS IBM 1428

The IBM 1285 Optical Reader can accept input from Series F Machines equipped with IBM 1428 type font type bars, narrow carriage, single ply roll paper, and OCR special inked ribbons as covered in the Burroughs Equipment Price Book Optional Features section.

Burroughs OCR special inked ribbons and single ply roll paper are listed in Business Machine Supplies Price List.

COMMAS AND DECIMALS

All decimal points and commas must be no larger than .030" in their printed horizontal dimension, and .034" in their vertical dimension. A space of .020" minimum must exist between every part of any two adjacent characters, decimals, or commas used with the IBM 1428 type font.

PAPER

Roll paper must meet the following requirements: (Burroughs single Ply Roll Paper meets all of these specifications.)

Basic Weight: 15 to 20 pound (weight of 500 sheets 17" x 22")

Thickness: .0025" to .0045".

Reflectance:

The paper must be white enough to reflect at

least 55% as much light as would be reflected from a surface of magnesium oxide (commonly used as a standard of whiteness).

Cleanliness:

A measure of paper quality is the mark count. A mark is a visible imperfection that cannot be contained in an area measuring 4×10^{-6} square inches. Paper used in the IBM 1285 must have a mark count of less than 150 marks per 1,000 square inches. No more than 50% of the marks may exceed .0001 square inch.

NOTE:

Excessively fluorescent paper must not be used for the IBM 1285. These papers contain compounds that generate light when excited by light. This heightens apparent whiteness and contrast when printed. If the paper used is suspected of containing fluorescent compounds, refer to your branch office for assistance in making evaluation.

PRINT FORMAT

The scan technique in the IBM 1285 allows considerable flexibility of print format. However, certain limiting conditions must be met regarding the position of printed lines, spacing, and the use of special characters.

PRINTING POSITIONDistance from End of Tape:

There must be at least 12" of unprinted tape at either end of the roll.

Distance from Edge or Tape:

No part of a character may be within .1" of either edge of the tape. The entire low-order character in a line to be read must be within .4" of the right edge of the tape. If a line is not to be read, the low-order character must be at least .6" from the edge.

Features**CHARACTER SPACING**

There must be at least .020" between every part of two adjacent characters. There must not be more than ten characters per inch in a printed line.

LINE SPACING

Printed lines must be separated by a continuous, clear band at least .050" high. There is no maximum limit to the space that can be left between lines.

BLANKED FIELDS

A single vertical strip can be blanked out of the scan area by using two format-blank knobs on the display panel. The strip can be anywhere on the tape. A blank space of at least .200" must separate characters that are to be read from those within the blanked vertical strip.

SPLICES

The IBM 1285 can read paper rolls up to 200 feet long. Those rolls that require header information are not spliced to the end of another tape because header information can be keyed in only when a tape is initially loaded.

Splices must meet the following specifications:

1. All edges (cut tape and splicing tape) must be perpendicular within ± 2 degrees to the edge of the tape.
2. The splice must be able to withstand a seven-pound tensile force.
3. Only pressure-sensitive transparent tape may be used.
4. The splicing tape may not extend beyond the tape edge but must extend to within 1/4" or less of the tape edge.
5. The total thickness of the splice, including papers and tape, may not exceed .015".
6. The tapes spliced must have the same width and must be aligned within .032" in 12".
7. The splicing tape must be applied only to the bottom (unprinted) side of the tape.

8. Butt splices: The maximum gap between the ends of the tapes is .015".
9. Overlapping splices:
 - a. The tape may not overlap more than 1/8".
 - b. The leading tape must lap on top of the trailing tape when passing through the transport.
 - c. The ends of the tape may not be folded or creased.
10. No part of a printed character can occur within .25" of any part of a splice, including the splicing tape.

TEARS

1. A tear on either edge may not be longer than 1/4 inch.
2. It must not result in document material being folded in so as to cover readable printing.
3. There must be at least 18 inches between tears.
4. No tears may exist in the printed line.
5. Except for a folded tear (as noted previously) the document must contain no areas of missing material.

OTHER DOCUMENT REQUIREMENTS

1. Surface mutilations due to foreign material such as staples, paper clips, adhesive tapes, etc. are not acceptable.
2. Materials which tend to change the reflectance characteristics of the base paper such as gum, wax, grease, glue, spilled liquids, or dirt are not acceptable.
3. Documents which have been folded, creased, or warped are acceptable only after they have been reconditioned to meet the following requirement: All portions of the document must lie between two parallel planes separated by a maximum distance of 1/8 inch under the weight of a flat, 80-column tabulating card.
4. Creases, wrinkles, and folds may not occur within two inches of the leading

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Features

end of the document (that end which is fed into the IBM 1285 first).

PRINT QUALITY

The quality of printing produced by Series F machines that prepare rolls for the IBM 1285 depends on:

1. The adjustment and maintenance condition of the Series F machine.
2. The condition of the ribbon.
3. The paper used.

CHARACTER-STROKE WIDTH

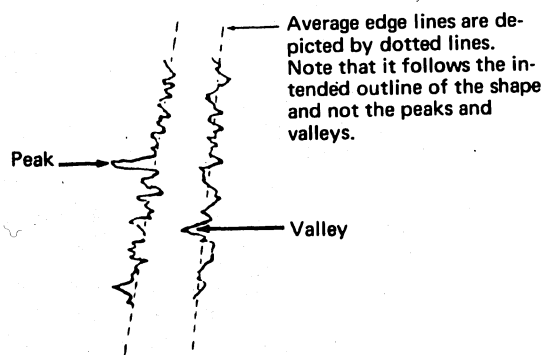


Fig. VII - 237

When viewed through a magnifier, the character stroke of ribbon printing appears ragged and lacks sharpness of edge definition. The stroke-width requirements outlined in this section are given as the distance between average edges of character strokes. The average edge of a character stroke is defined as an imaginary line drawn through the peaks and valleys of the printed edge. This is illustrated in Figure VII-237. This average-edge line averages out the peaks and valleys (within certain limitations given in this section) to show the intended shape of the character. In fact, although imaginary, this average-edge line is closely analogous to the line actually read by the IBM 1285, in that it does actually sense and ignore extraneous bulges and voids on the edge of a character (again, within the limitations given in this section). The direction of the line at a given point is determined by the average peaks and valleys along a .025" increment of the character stroke. If the width of a line is relatively uniform, then the average edges

representing each side of the line are parallel. If the line appears tapered, then the average-edge lines are tapered and not parallel.

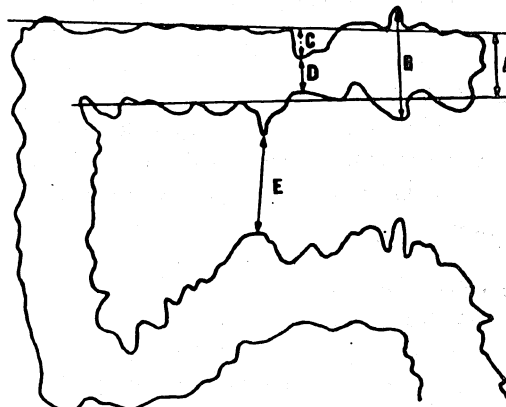


Fig. VII - 238

Based on this definition, the minimum and maximum dimensions in Figure VII-238 are:

- A Average stroke width: .008" - .020".
- B Maximum height of peaks in excess of average width: .008".
- C Minimum depth of valleys less than average width: .008". This applies to two valleys directly opposite each other on the two edges of a stroke. D is an exception to this allowance.
- D Minimum actual width of a stroke at a point: .006".
- E Minimum distance between actual edges of different strokes: .007". A character that does not meet requirement "E" is not acceptable even if the character is acceptable under requirements A, B, C, and D.

REFLECTANCE

The light reflected from the inked area that forms the printed character must be less than 50% as much as that reflected from the surrounding background paper. This reflectance must not vary more than 20% in .025" increments of stroke length. These percentages are given as those allowable when measured by using the IBM 1285 reading system.

Features**VOIDS AND BREAKTHROUGHS**

An area within the intended character stroke which does not meet the reflectance requirement is permissible if not too large. A void is an island of insufficiently inked paper within the area of the character stroke. A breakthrough is a discontinuity in the intended line. Voids are measured by their largest dimension. The size of a breakthrough is defined as the average of:

1. The closest the broken line comes to meeting, measured parallel to the direction of the line, and
2. The distance between the closest points on each side of the final breakthrough at which the inked area crosses either average edge, also measured parallel to the direction of the line.

The maximum permissible size of a void or breakthrough is .006". Not more than one void or breakthrough larger than .003" may occur in any .090" of stroke length.

OPTICAL NOISE

Ink splatters, erasures, paper imperfections, and any other source of a change in reflectance other than the printed character are treated alike. This optical noise may not cause the reflectance of any .030" by .035" area to vary more than 15% from the average reflectance of the paper.

PRINT REGISTRATION

The reading band for every printed line is defined as an area of the document whose height is .122" for the IBM 1428 type font. The reading-band width is equal to the width of the document. All characters in the line must be entirely within this band. Character skew (the angle between the vertical center line of a character and the right edge of the paper) must not exceed three degrees.

Burroughs
SERIES F25-F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F700 and F5000)

INSTRUCTION BOOK

Section VIII



SERVICING PROCEDURES

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PREVENTIVE MAINTENANCE GUIDE

Series F25-F700, F5000 and F6000

The following is an outline of the procedure to follow on a Preventive Maintenance Attention for all Basic F machines.

A. INITIAL PROCEDURE:

Prior to any mechanical work, perform the following steps:

1. Inquire of the operator of any condition that he (or she) has noticed that requires correction.
2. Determine from operator if there are any stored totals in the machine, including counter dials.
3. Make operating tests of machine. Use all keys, operator control keys, motor bars etc. Note any peculiarities of operation with respect to machine speed, unusual sounds, printing, carriage movement, accumulation, etc.

B. APPROVED LUBRICANTS AND CLEANING AGENTS:

The following approved lubricants and cleaning agents are to be used when performing the Preventive Maintenance Attention.

1. Machine Oil S131A - to be used on all shaft bearings, pivot points, rollers, oil holes, and metal to metal contact of moving parts.
2. Machine Grease S167 $\frac{1}{4}$ A - to be used on all cams, forked arms, and slots where contact is made with studs and metal gears.
3. Platen Restorer S3 - to be used to clean platen, pressure rolls, feed rolls, and twirlers.
4. Case cleaner and Polish S11 - to be used for cleaning all case panels.
5. Drive Oil S165 $\frac{1}{2}$ B - to be used on upper and lower bearings of tab and return shaft assemblies in gear box.

C. GENERAL INSTRUCTIONS:

The inspection should be performed systematically, and cover all sections of the machine. Special attention should be given to areas where experience has indicated that trouble may exist.

1. Each section should be properly cleaned of all dust, old grease, foreign matter, and properly lubricated, (including extra control panels).
2. All parts and mechanisms should operate freely, and perform according to tests and adjustments. Make necessary corrections to meet these conditions.
3. All sections should be inspected for any worn, broken, or defective parts. Replace any found faulty.
4. All loose nuts, screws, etc., should be tightened.
5. Check all wiring and terminals to be in good condition.
6. Correction Index improvements should be installed to maintain the machine in the best condition.

D. SPECIFIC INSTRUCTIONS:

Listed below are sections and connecting mechanisms with specific areas where trouble may exist. It is important that Correction Index parts be installed whenever a section is removed from a machine.

1. Power Section
 - a. Apply general instructions.
 - b. Check clutch dog for wear.
 - c. Check condition and adjustment of motor friction drive clutch.
2. Keyboard Section and Indexing Mechanism
 - a. Apply general instructions.
 - b. Check bull gears and pinion shafts for mesh and alignment, (especially F5000).
3. Printing Section
 - a. Apply general instructions.
 - b. Check condition of hammer springs.
 - c. Clean type.

4. Accumulator sections, including register selection and meshing mechanisms.
 - a. Apply general instructions.
 - b. Check carry reset adjustment.
 - c. Particular attention should be given to the register selection mechanism as to adjustment and wear of index rack, selection rack, over throw limit of selection rack, and register step plate.
5. Carriage - including control units, sensing unit, and carriage drive unit.
 - a. Apply general instructions.
 - b. Check drive trip interlock adjustments.
 - c. Machine should have felt disc carriage drive clutch (oiled).
 - d. Check count slides for wear (F402 and F404).
 - e. Check upper and lower bearings of tab and return shaft assemblies.

NOTE: If adjustments, other than adjustments contained in Series F25-F500 (includes F700 and F5000) Instruction Book, Form 3740, are necessary to maintain a satisfactory level of operation of the system, a complete report describing the need for such adjustment must be made to the Accounting Machine Products Group, Home Office.

After the completion of inspection, have operator test machine while preparing Service reports.

SOME MACHINE OPERATING TESTS

1. To check the relay carry:

.00* /#

.00# *

.10++

.20--

.20++

.20--

.20++

.20--

.20++

.20--

.20++

.20--

.10● /#

.10# ●

.10* /#

.10# *

.00* /#

.00# *

.01++

.02--

.02++

.02--

.02++

.02--

.02++

.02--

.02++

.02--

.02++

.01● /#

.01# ●

.01* /#

.01# *

.00* /#

.00# *

Subtotal "A"

Subtotal "B"

Total "A"

Total "B"

Subtotal "A"

Subtotal "B"

Total "A"

Total "B"

2. To check direct carries when adding and subtracting.

Test run the combinations according to the listing capacity of the machine.

.00* /#

.00# *

Add 50 times 999,999,999.99++

Subtotal "A" 9,999,999,999.50● /#

Subtotal "B" 9,999,999,999.50# ●

Subtract 50 times 999,999,999.99--

Subtotal "A" .00● /#

Subtotal "B" .00# ●

Total "A" .00* /#

Total "B" .00# *

Add 50 times 585,858,585.85++

Subtotal "A" 9,292,929,292.50● /#

Subtotal "B" 9,292,929,292.50# ●

Subtract 50 times 585,858,585.85--

Subtotal "A" .00● /#

Subtotal "B" .00# ●

Total "A" .00* /#

Total "B" .00# *

.00# *

.00# *

.01++

.10++

1.00++

10.00++

100.00++

1,000.00++

10,000.00++

.00# *

.00# *

.01++

.10++

1.00++

10.00++

100.00++

1,000.00++

10,000.00++

Note: Correct register totals will be complements (9, 999, 999, 999.99) according to the capacity of the machine.

	100,000.00++	100,000,000.00++
	1,000,000.00++	111,111,111.11++
	10,000,000.00++	222,222,222.22++
	100,000,000.00++	333,333,333.33++
Total	111,111,111.11	444,444,444.44++
		555,555,555.55++
		666,666,666.66++
		777,777,777.77++
		888,888,888.88++
		999,999,999.99++
	Totals:	5,099,999,999.95

Repeat above test using figures 2, 3, 4, 5, 6, 7, 8, and 9.

4. To check accumulation, direct carries, relay carries, type alignment and type impression: Use the following test according to capacity for all machines.

Clear the accumulators and list the following figures 5 times each - including the dates, characters, etc.

5. Operate the machine on all four schedules with the carriage controls active according to the Form Layout for the machine.

Check the posting run for the following:

- a. Correct tabulation and return.
- b. Correct accumulation.
- c. Correct form spacing and carriage opening.
- d. Correct machine functions in all stop positions.

Removal and Replacement Procedures

MACHINE CASE (F25 - F500)

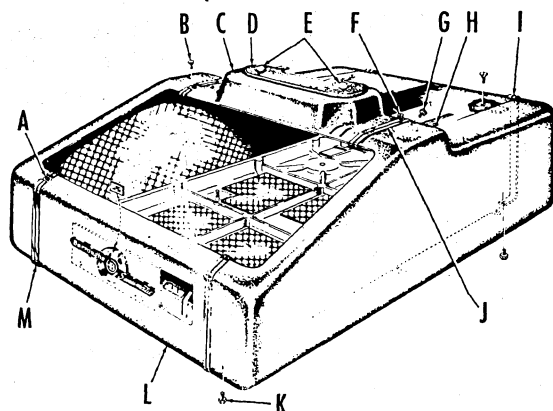


Fig. VIII-1

A. Removal

1. Manually locate the carriage in the extreme left position.
2. Remove rear form guide and sensimatic control panel assemblies.
3. Loosen 8 screws K and remove 2 strips I and 2 strips M.
4. Detach electric cord from machine.
5. Remove rear panel by pulling rearward.
6. Remove 2 screws A and panel L.
7. Loosen 2 screws E and remove ribbon cover D.
8. Remove Tab., Return, Carriage Open and Close and Disabling lever keytops.
9. Loosen 2 screws F and remove 2 strips J.
10. Remove 2 screws B.
11. Remove panel C.
12. Remove side panels.

NOTE: On some styles of machine stands the Check Tables may have to be lowered temporarily to facilitate the removal of side panels.

B. Replacement

1. Replace parts in reverse order.
- NOTES: a. If machine contains dial counters, care should be taken to prevent front case panel L binding the dial counter.
- b. Observe the 2 button studs

on inside of rear panel are located in fork on machine crossmember.

MACHINE CASE (F5000)

A. Removal

1. Manually locate the carriage in the extreme left position.
2. Remove rear form guides and sensimatic control panel.
3. Detach electric cord from machine.
4. Turn 2 lower quarter turn screws in rear panel counter clockwise 1/4 turn.
5. Bump side panels slightly forward and remove panels.

NOTE: Lowering stand shelves will facilitate removal of side panels.

6. Turn 2 upper quarter turn screws in rear panel counter clockwise 1/4 turn.
7. Remove rear panel by pulling rearward.
8. Loosen 2 screws in ribbon cover and remove cover.
9. Remove Tab., Return, Carriage Open and Close and Disabling lever keytops.
10. Turn 2 quarter turn screws in top panel retaining plates 1/4 turn counter clockwise. Remove 2 retaining plates.
11. Remove top panel.
12. Turn 2 quarter turn screws in front panel retaining plates 1/4 turn counter clockwise and remove 2 retaining plates.
13. Remove front panel.

B. Replacement

1. Replace parts in reverse order.

NOTES: a. If machine contains counter dials care should be taken to prevent front panel binding dial counter.

- b. Be sure rubber edging on side panels is in place on edge of panel after installing.
- c. Observe the button studs in side of rear panel are located in forks on machine crossmember.

BASE

A. Tilting Machine on Base

1. Remove machine case.

NOTE: Before tilting the machine be sure 2 screws which hold the machine to the stand extend completely through the machine stand into the center front and center rear of the machine base.

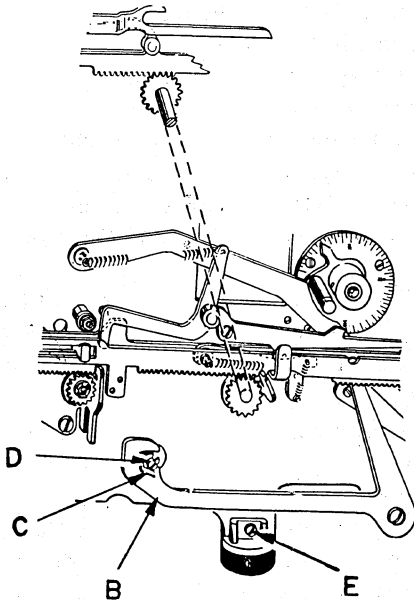


Fig. VIII-2

2. Remove 6 screws E from the rubber shock mounts in the machine base.
3. On machines constructed with accumulators C - Remove clip C and arm B from Post D.

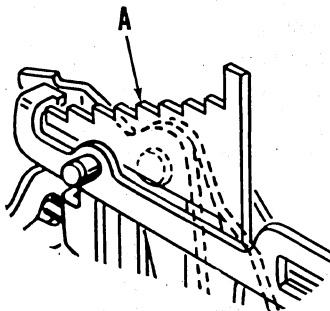


Fig. VIII-3

NOTE: On machines constructed with 9 pinion register selection mechanism, be sure step plate A is in the raised position.

4. Raise front of machine and insert support rod from base into the slotted hole in the left sideframe located to the rear of the cluster gear unit.

NOTE: Some machines are equipped with a toggle arrangement to support the machine in tilted position. One of the screws from the rubber shock mounts should be inserted in the hole provided to prevent accidentally releasing the toggle.

B. Lowering Machine to Base

1. Replace parts to original positions in reverse order.

MOTOR

A. Removal

1. Remove Case.
2. Remove motor lead from left terminal (facing rear of machine).
3. Remove fuse holder cap by depressing and turning counter clockwise.
4. Remove screw and plastic wire holder from sensing unit back plate.
5. Loosen 4 screws which hold motor to left sideframe of machine and slide motor rearward slightly to remove.
6. Remove leather coupling from worm plate.

B. Replacement

1. Place leather coupling on end of clutch drum.
2. Insert screw head in motor mounts through holes.
3. Replace motor in slots of sideframe, slide forward to within .020" of worm disk and tighten screws.
4. Reattach plastic wire holder to back plate with screw.
5. Depress top of fuse holder into fuse holder and turn clockwise.
6. Replace taper tab on terminal block.
7. Replace case panels.

KEYBOARD (F25 - F500)

A. Removal

1. Remove case.
2. Remove 2 screws in motor bar No. 2.
3. Remove 2 screws in lower keyboard plate on left side.
4. Loosen rear screw in upper right side of lower keyboard plate.
5. Loosen shoulder screw in lower right side of lower keyboard plate.
6. Remove or disconnect any additional parts attached to the keyboard, such as count mechanisms.
7. Remove keyboard.

B. Replacement

1. Replace in reverse order.
2. Verify that all studs levers and linkages are in their proper positions.
3. Recheck Rotary Calendar feature adjustments found in Sec. VII of this book.

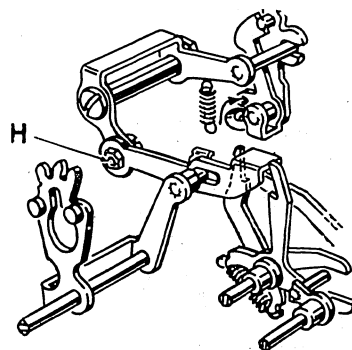


Fig. VIII-5

5. Remove screw H.
6. Remove screw C and collar G.
7. Remove 3 screws F and collars G.
8. Rock accumulator pinions into mesh with adding racks by moving meshing hook post rearward and remove crossfooter left end first.

B. Replacement

1. Replace in reverse order.

CROSSFOOTER

A. Removal

1. Remove case.
2. Tilt machine on base.
3. Trip drive and manually cycle machine to approximately 190°

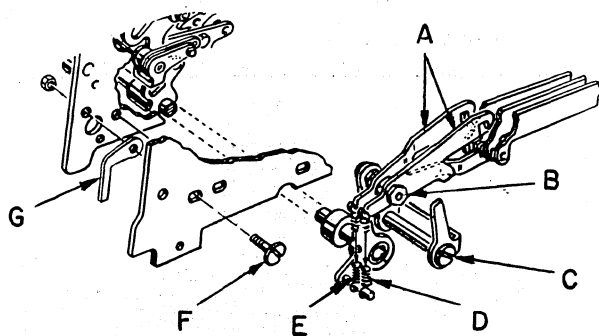


Fig. VIII-4

4. Remove springs D and E, nut B and meshing hooks A.

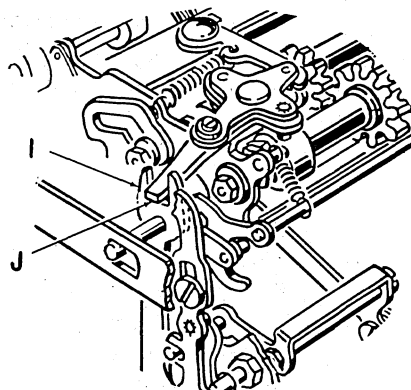


Fig. VIII-6

- NOTE: Be sure part J is in the fork of I.
2. Adjust eccentrics in meshing hooks in accordance with accumulation control in Sec. V.

REGISTER

A. Removal

1. Remove case and tilt machine on base.

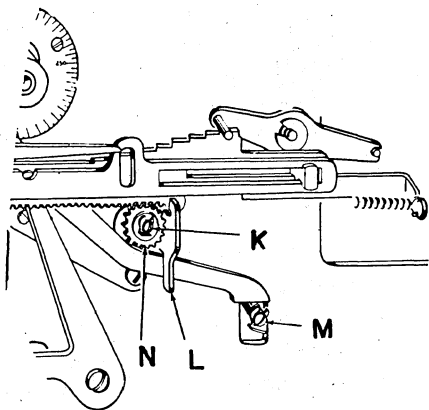


Fig. VIII-7

2. Remove bracket L, gear N, post K with coupler and post M.
3. Remove springs D and E, nut B and meshing hooks A.
4. Remove 4 screws F and collars G.
5. Rock accumulator pinions into mesh with adding racks by moving meshing hook post rearward and remove register left end first.

B. Replacement

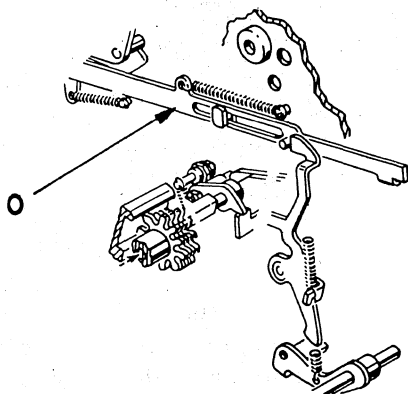


Fig. VIII-8

1. Latch rack O in rearward position.
2. Reassemble in reverse order.
3. Perform tests and adjustments for meshing hooks and register selection as outlined in Sec. V of this book.

CLUSTER GEAR UNIT

A. Removal

1. Remove case and tilt machine on base.
2. With keys on keyboard, that will raise type sectors to their highest position depressed, trip drive and cycle machine manually to approximately 180°

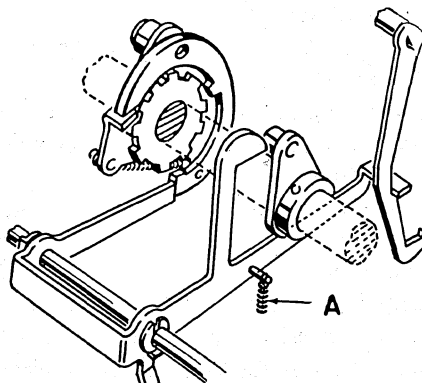


Fig. VIII-9

3. Unhook spring A if it is attached to the cluster gear unit.

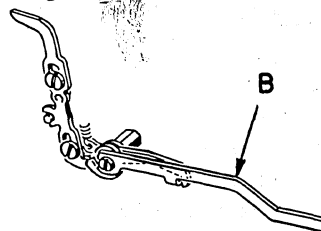


Fig. VIII-10

4. Remove link B.
5. Remove support plate from right end of symbol shafts.

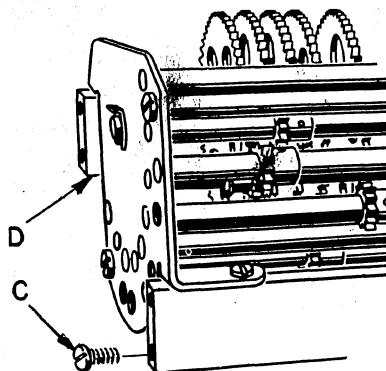


Fig. VIII-11

6. Remove 8 screws C.
 7. Remove gear cluster unit.
 8. Cycle machine to home position.
- B. Replacement (F25 - F500)**
1. Position type bars in machine to approximately No. 5 position.
 2. Place the gear cluster unit into machine until it contacts the ends of the type bars. Temporarily retain unit with 2 screws.
 3. Guide the type bars through the guide comb of the cluster gear unit into mesh with their respective gears.
 4. Remove the 2 screws retaining the cluster gear unit and move the cluster gear unit up into mesh with the adding sectors.
 5. Replace 8 screws C.
 6. With each adding sector moved to the side with a spring hook, to disengage the teeth of the cluster gear unit. Move each type bar downward to its limits then raise one tooth. This is the normal position for the type bars.
 7. Remesh symbol gears and replace support plate for symbol shafts.
 8. Replace spring A and link B.
 9. Check sample print of machine to be sure type bars are meshed properly.
- C. Replacement (F5000)**
1. Attach the gear cluster unit to the sideframes using 2 screws and the holes for the rubber shock mounts.
 2. Beginning on the left side, align the first type bars in each head by starting the tip of each bar into the guide comb. With the first tooth of each type bar meshed with the cluster gears, apply light pressure to both bars simultaneously moving them downward until the lower ends align evenly with the lower edge of crossmember D. This is a reference point to ensure each type bar is properly meshed with the cluster gear unit.
 3. Repeat step 2 for each pair of type bars.
 4. Move cluster gear unit into mesh with adding sectors and replace 8 screws C.
 5. With each add sector moved to the side with a spring hook, move the type bars down to its limit, then raise one tooth. This is the normal position for the type bars.

6. Remesh gears for symbol columns and replace support plate for symbol shafts.
7. Replace spring A and link B.
8. Check sample print from machine to be sure type bars are meshed properly.

CARRIAGE

A. Removal

1. Remove case, sensimatic control panel and rear form guides.
 2. Remove 2 screws from rear upper ears of the gear box.
 3. Remove 4 screws that hold carriage rails to sideframes of machines.
- NOTE: If carriage rails do not have brackets on both ends of rails secure rail before removing screws.
4. Remove carriage.
 5. Observe number and position of shims under carriage raceway if any.
 6. Remove hold down mechanism for carriage drive gears.

B. Replacement

1. Replace carriage on sideframes and observe the following before replacing screws.

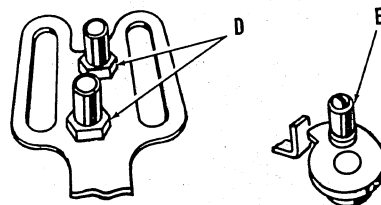


Fig. VIII-12

- a. Carriage opening bail must be between rollers D.
 - b. Space bail must be to the rear of roller E.
 - c. Replace shims on sideframes and gear box lips.
 - d. Mesh teeth of tab and return rack with tab and return gears.
 - e. Check hold down plate for tab and return gears to be in place.
2. Replace screws and remaining parts.

SENSING UNIT

A. Removal

1. Remove case and supports on rear edge of base which hold machine in tilted position.

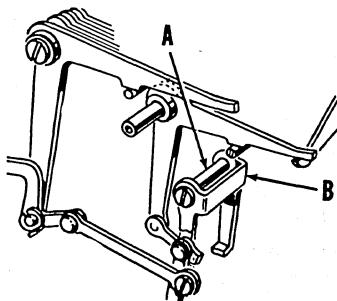


Fig. VIII-13

2. Remove post A.

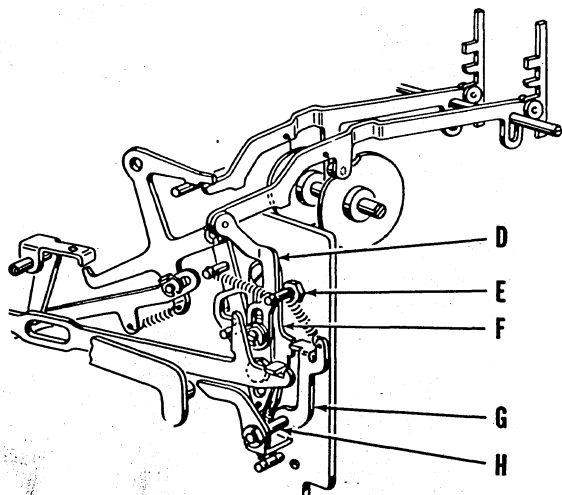


Fig. VIII-14

3. Unhook any sensing lever linkages such as Repeat of Red Ribbon or printing control for left head.

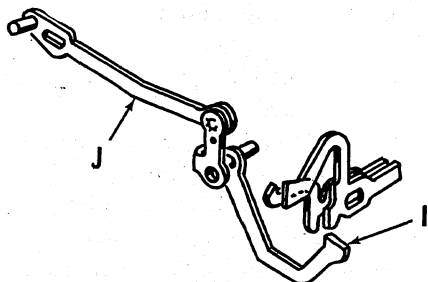


Fig. VIII-15

4. Disengage link J from I.
 5. Remove screw from sensing unit to left sideframe of gear box.
 6. Disconnect motor wires.
 7. Unhook any springs from count mechanism and register selection mechanism.
 8. Remove 4 screws which hold the unit to the machine sideframes.
 9. Remove or disconnect any other parts that may be on some styles of machines and remove unit.
- B. Replacement
1. Replace in reverse order.
 2. Check sensing camshaft adjustments in Sec. II of this book.

PRINTING SECTION

A. Removal

1. Remove case.
2. Remove Ribbon, unhook spring and swing ribbon actuating arm to left.
3. Mark home position of printing control camshaft.

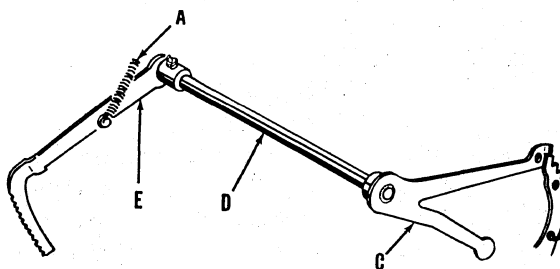


Fig. VIII-16

4. Remove spring A, screw in arm E and, clip from shaft D; slide shaft D to the right. Remove arm E.

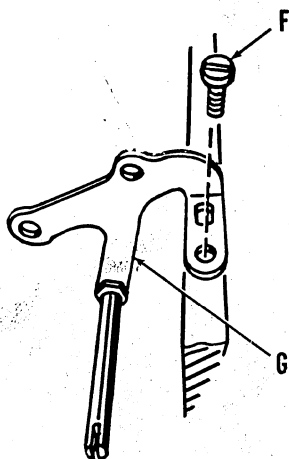


Fig. VIII-17

5. Remove brace G.
6. Remove long spring on left side of printing section.

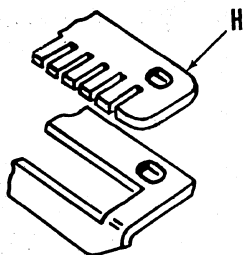


Fig. VIII-18

7. Remove screws from type bar guide H.
 8. Remove 4 screws that hold printing section to machine cross members.
 9. Cycle machine to raise type bars to their highest position.
 10. Disconnect ribbon lifting arms and remove printing section.
- B. Replacement**
1. Replace in reverse order.
 2. Reset printing camshaft.
 3. Adjust printing section as outlined in Sec. IV of this book.

CARRIAGE DRIVE UNIT (Gear Box)

A. Removal

1. Remove case, motor, carriage, and sensing unit

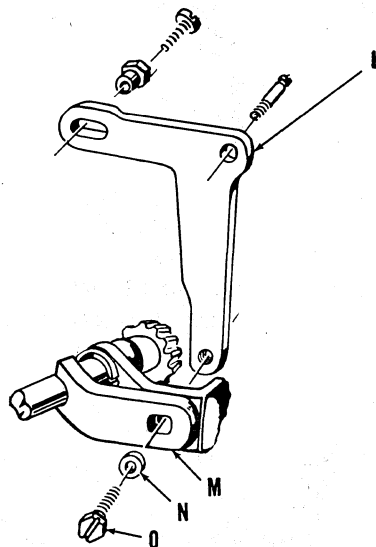


Fig. VIII-19

2. Remove bracket M, brace K and clip G.

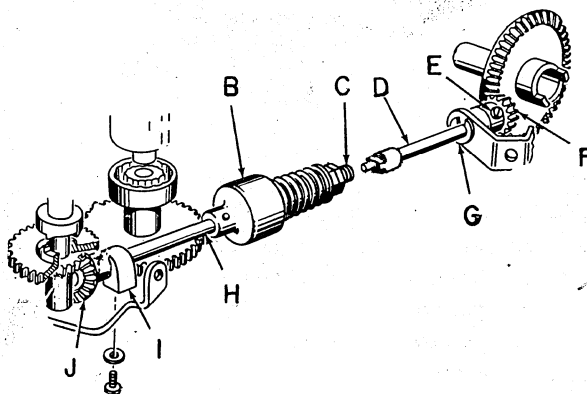


Fig. VIII-20

3. Loosen screw E and slide shaft D forward uncoupling from C.

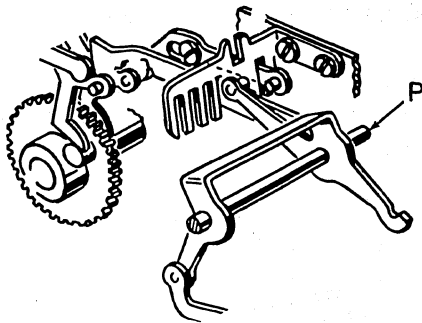


Fig. VIII-21

4. Remove clips from shaft P and slide to right so that the end of P clears the side-frame.

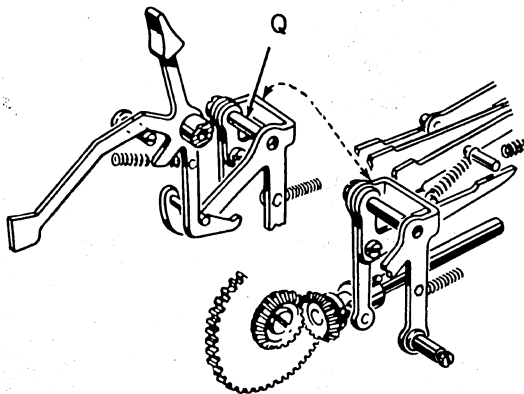


Fig. VIII-22

5. Remove nut from screw Q.
 6. Remove 2 screws from upper front ears of gear box.
 7. Remove gear box.
- B. Replacement
1. Replace in reverse order.
 2. Check carriage tab and return, brake, and interlock adjustments in Sec. VI.

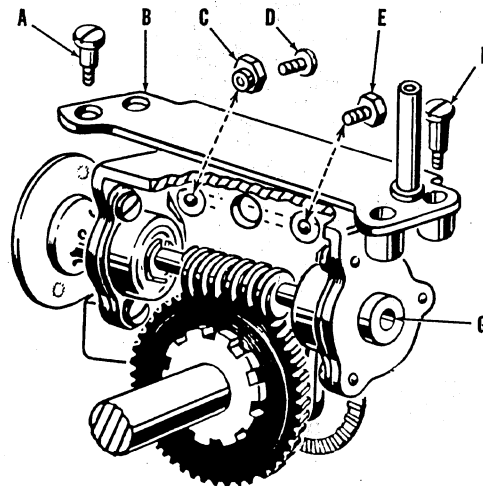


Fig. VIII-23

2. Remove ribbon actuating arm from bracket B and left adding rack actuating arm.

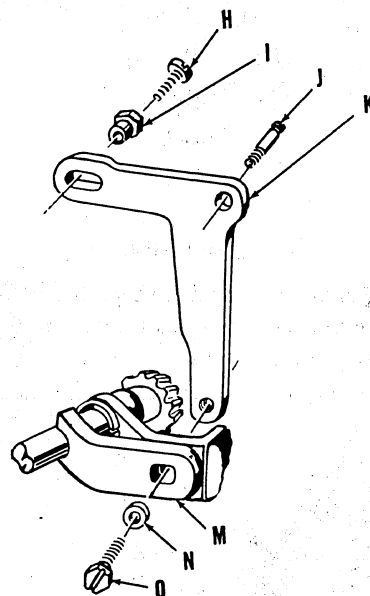


Fig. VIII-24

3. Remove braces K and M.

CARRIAGE DRIVE CLUTCH

A. Removal

1. Remove case and motor.

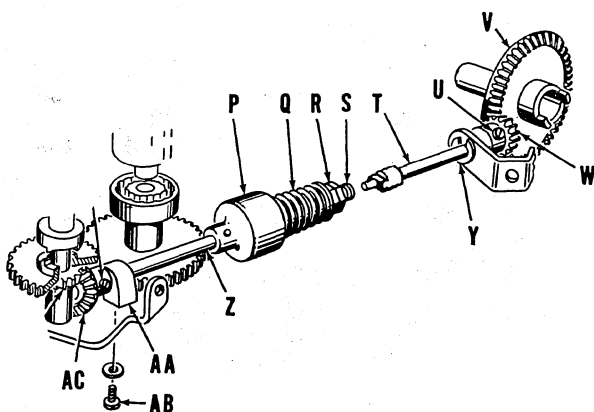


Fig. VIII-25

4. Remove clip Y, loosen screw U and slide shaft T forward to separate from clutch S.
5. Remove screw D and eccentric C, 3 screws E, 2 screws A and 2 screws F.
6. Tilt bracket B and remove shaft T and gear W.
7. Remove clutch S.
8. If drum P is to be removed loosen screw AB in bushing AA and slide Z forward.

B. Replacement

1. Replace part in reverse order. Caution, if machine contained space washers between B and Y be sure the washers are on shaft T before it is reinstalled.
2. Check drive adjustments as outlined in Sec. II.

ADDING RACKS

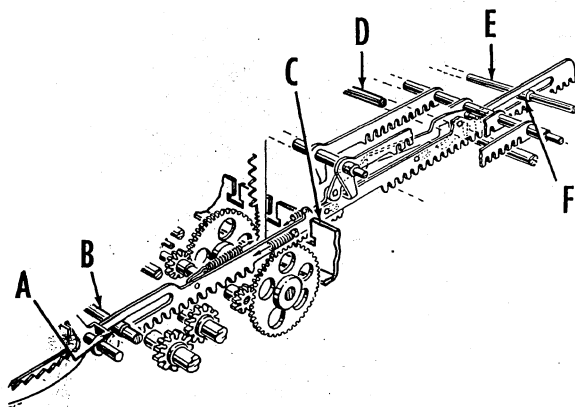


Fig. VIII-26

A. Removal

1. Remove case and tilt machine on base.
2. Remove accumulator "B" cluster gear unit and accumulator "C" if contained in machine.
3. Remove guide comb C.
4. Remove clips from shaft D and slide to left through hole in sideframe.

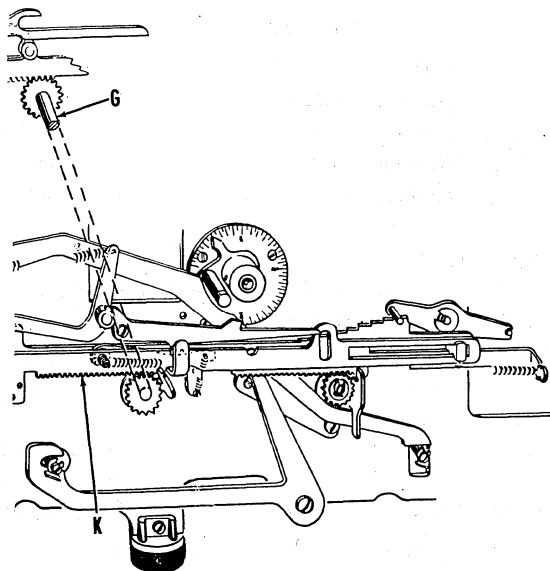


Fig. VIII-27

NOTE: In four register selection construction the register selection rack must be removed. In nine register construction remove shaft G and move register selection rack forward.

5. Loosen retaining clips and slide rack support shafts B and E to the left.
6. Unhook hooster spring and remove adding rack with bushings A and F.
7. Remove bushings A and F from rack and insert in new rack.

B. Replacement

1. Replace parts in reverse order.

TYPE BARS (F5000)

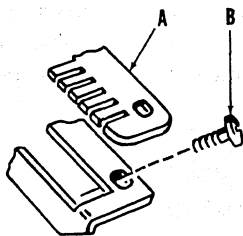


Fig. VIII-28

A. Removal

1. Remove upper guide combs A for right and left heads if bar to be removed has offset.
2. Disengage adding rack from the cluster gear unit and lift type bars from printing section.

B. Replacement

1. Position type bar in upper guide comb.
2. Place the left type bar in the cluster gear unit guide comb, with the play of the gear held upward and toward the front of the machine with a spring hook.
3. Place the right type bar in the cluster gear guide comb.
4. Disengage the adding rack from the cluster gear unit, both type bars will mesh with the cluster gear unit simultaneously. Depress type bars to lower limit and raise one tooth.
5. Replace upper guide comb A and check adjustment in Sec. IV.

MAIN CAMSHAFT

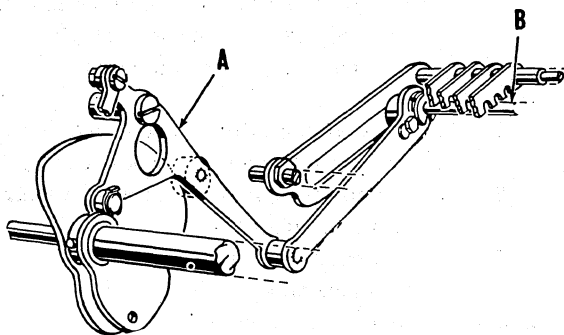


Fig. VIII-29

A. Removal (as unit Recommended for F25-F500)

1. Remove case, motor, keyboard, carriage and printing section.

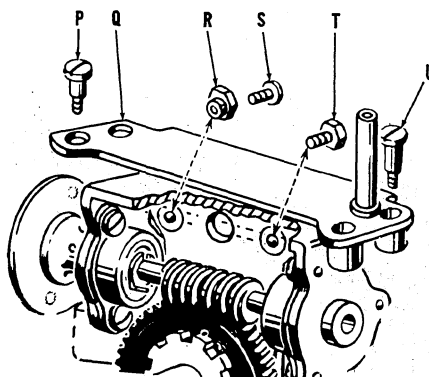


Fig. VIII-30

2. Remove machine from base and place on suitable work table.

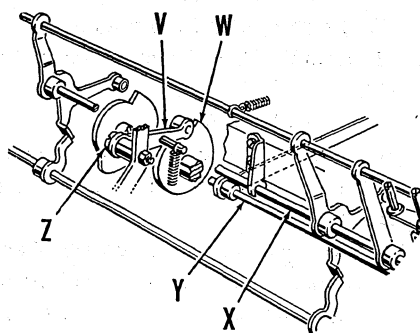


Fig. VIII-31

3. Remove shaft B.

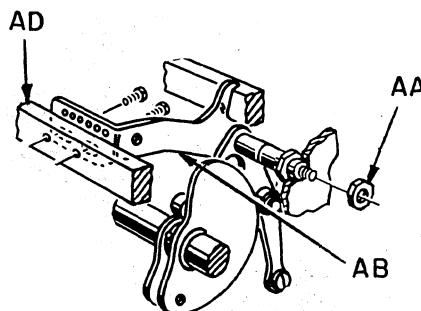


Fig. VIII-32

4. Remove bracket Q, detent V, nut AA and brace AB, kicker arm assembly AC, the nuts from right end of camshaft and screws from right end of AD.

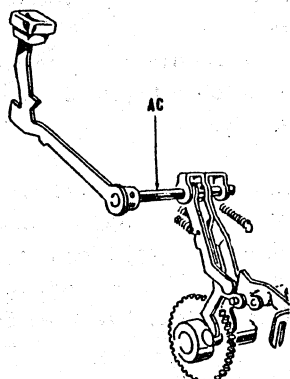


Fig. VIII-33

5. Remove left machine sideframe by removing all nuts, screws, clips, etc., holding parts to sideframe. Caution, support accumulators and cluster gear unit to prevent damage due to strain.
6. Remove crossmember AD.
7. Remove shaft assemblies X and Y.
8. Remove camshaft to left.
- B. Replacement
 1. Replace parts in reverse order.
- C. Removal (by removing pins from cams-- recommended for wide base machines).
 1. Remove case, motor, carriage and printing section(s).
 2. Remove bracket Q and carriage clutch drive shaft and gear.
 3. Remove shaft AC and manual control keys.
 4. Remove actuating shaft B.
 5. Remove screws holding actuating arms A.
6. Cycle machine slowly to position small end of pins upward.
7. Loosen pins in all cams except sensing unit drive gear. Use Kit 90 or Kit 587B-20 (punch) ground to size of small end of pins, with Kit 632 (camshaft brace) supporting camshaft. Care should be taken not to mar shaft as this will make cam removal difficult. After pins are loosened, removal may be completed with a piece of spring hook shaft ground to size.
8. Remove rivet and roller on sensing unit drive gear so pin in drive gear can be loosened. Mark mesh of sensing unit drive gear. (This avoids readjusting the sensing unit). Drive pin in sensing unit drive gear as outlines in Step #7.
9. Remove nuts and spacer from right end of camshaft.
10. Remove timing belt and screws from degree indicator on left end of camshaft if contained on machine.
11. Remove camshaft to left using a follow-up shaft (Kit 90 may be used). Remove carefully to prevent damage to cam actuated parts.
12. Remove sensing unit drive gear and replace roller using a new rivet.
- D. Replacement
 1. Replace parts in reverse order. NOTE: Remesh sensing unit gears as marked before installing pin.

KEYBOARD (F5000)**A. Removal**

1. Remove 2 screws through left section of the keyboard which hold the section to the auxiliary sideframe.
2. Remove the left section of the keyboard by raising slightly and moving to the left.
3. Remove 4 clips which hold Rotary Calendar feature indexing linkages in place.
4. Remove 2 screws on lower keyboard plate on left side.
5. Remove motor bar No. 2 keytops by pulling upward on the bar.
6. Remove 2 screws on lower keyboard plate on right auxiliary sideframe.

7. Remove screw on lower keyboard plate near motor bar one.
8. Loosen screw on lower keyboard plate near motor bar four.
9. Remove or disconnect any additional attachments to the keyboard.
10. Remove keyboard.

B. Replacement

1. Replace parts in reverse order.
2. Ascertain that all studs, slides, levers, etc. are in their proper position.
3. Recheck Rotary Calendar feature adjustment found in Sec. VII of this book.

Servicing Procedures

MACHINE CASE (F6000)

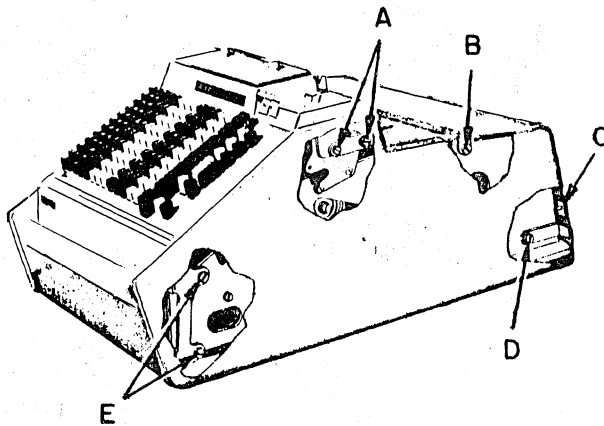


Fig. VIII-34

BASE (F6000)

A. Tilting machine and base.

1. Remove machine case.
2. Remove two (2) screws which attach machine to the stand.
3. Swing legs E rearward until limited by post F.
4. Raise front of machine until rear legs E rest on stand.
5. Extend supports D down and forward until limited by post C. (The principle weight of the machine rests on the base casting. The supports prevent tipping only.)

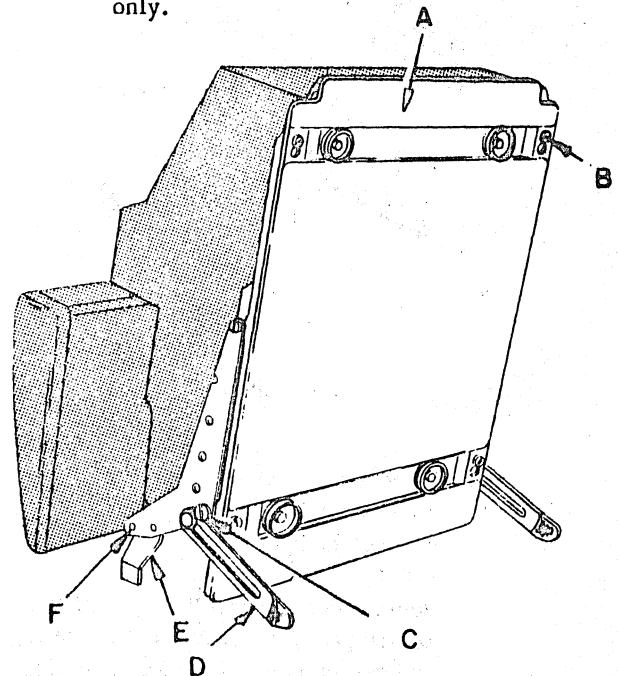


Fig. VIII-35

A. Removal

1. Manually locate the carriage in the extreme right position.
2. Remove rear form chute and Sensimatic Control Unit.
3. Detach electric line cord from machine.
4. Rotate two (2) snap screws C, in rear case panel counter-clockwise 1/4 turn.
5. Remove side panels.
6. Loosen four (4) screws B and D to remove rear case panel.
7. Remove ribbon cover.
8. Remove carriage control disabling lever keytop.
9. Loosen four (4) screws A, and remove top panel.
10. Loosen four (4) screws E, and remove front panel.

B. Replacement

1. Replace parts in reverse order.

NOTES: A. Observe the two (2) button studs on inside of rear panel are located in fork on machine crossmember.

- B. If machine contains dial counter or rotary calendar feature, check component parts for unrestricted movement.

B. Oil pan removal

1. Loosen four (4) screws B.
2. Raise oil pan to align four (4) screw heads with holes and remove.

NOTE: DO NOT REMOVE BASE CASTING. Proper machine function depends upon the rigid foundation provided by this casting and normal service and preventative maintenance procedures can be made through access openings.

Servicing Procedures

✓ A.F.A. SENSORS

A. Removal

1. Remove right and left inner cage end covers.
2. Open carriage and tilt back inner carriage.
3. Remove plastic aligning table.

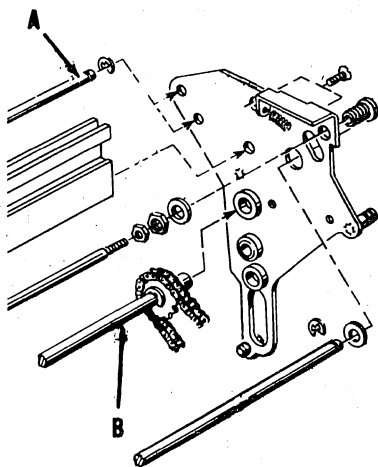


Fig. VIII-36

4. Remove two shafts A Figure VIII-36.
5. Move shaft B to right or left depending on whether right or left A.S.R. or E.S.L.
6. Remove nuts C and D Figure VIII-37. Loosen part E and hold F out at the top and gently push down. Caution: Do not overtighten C, D and E nuts when reassembling.

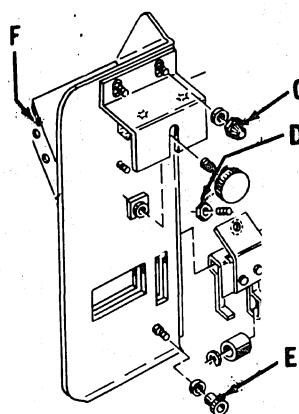


Fig. VIII-37

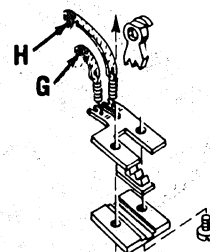


Fig. VIII-38

7. Unhook springs G and H Figure VIII-38.
8. Remove screw in I Figure VIII-39, move part I to the left as far as possible, being careful that feed roll J does not fall out before shim or shims can be noted for replacement.
9. Remove spring L and cover K together. Use a spring hook on the right edge of K and lift hook of spring out of O. Carefully remove spring and cover together.
10. Replace sensor.
11. Reassemble by reversing procedure.
12. Check adjustment C47-1, Section VII, Page 111 of this manual, pertaining to positioning of punch die to front of guide.

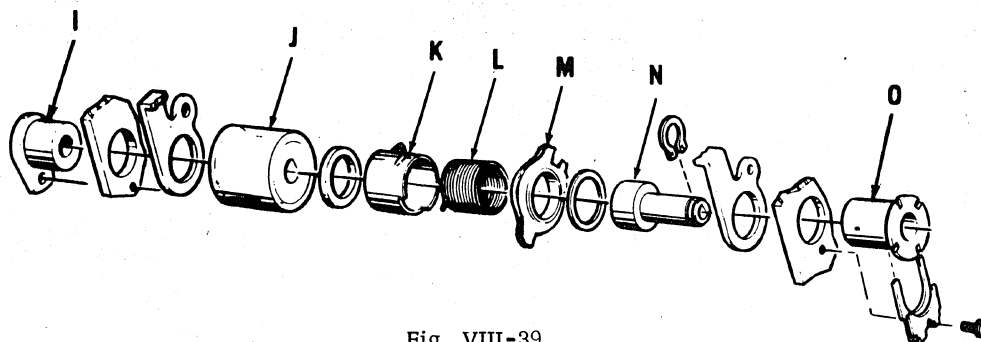


Fig. VIII-39

Lovejoy

MACHINE CASE (F6000)

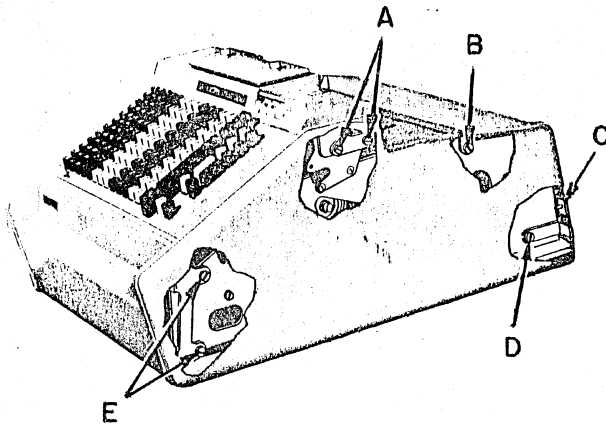


Fig. VIII-34

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8. Remove carriage control disabling lever keytop.
9. Loosen four (4) screws A, and remove top panel.
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1. Replace parts in reverse order.

NOTES: A. Observe the two (2) button studs on inside of rear panel are located in fork on machine crossmember.

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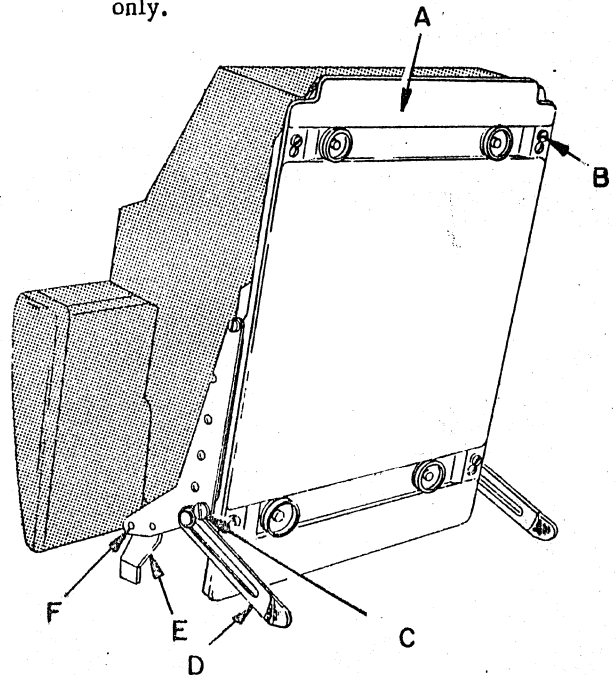


Fig. VIII-35

B. Oil pan removal

1. Loosen four (4) screws B.
2. Raise oil pan to align four (4) screw heads with holes and remove.

NOTE: DO NOT REMOVE BASE CASTING. Proper machine function depends upon the rigid foundation provided by this casting and normal service and preventative maintenance procedures can be made through access openings.

Burroughs
SERIES F25 - F500
SENSIMATIC ACCOUNTING MACHINE
(Includes F700 and F5000)

INSTRUCTION BOOK

Section IX



CORRECTION INDEX